The Chemical Age

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Notes and Comments

Mellon Institute Fellowship Researches

THE great value of the Fellowship researches conducted at the Mellon Institute is stressed in the annual report of the Institute to which we made brief reference last week. The Iodine Fellowship, of which G. M. Karns is the incumbent, has continued its investigations both at the Institute and through its established agencies. In the course of its study of the iodine content of animal and vegetable tissues, the fellowship has devised novel apparatus and methods for use in the microanalysis for iodine. The staff of the multiple fellowship of the Carbide and Carbon Chemicals Corporation carried out a number of fruitful investigations during the year, several amines being evaluated for use in removing acid gases from certain types of industrial gases and airs. These amines were also studied to determine their efficiency in desulphurising petroleum and aromatic hydro-carbons. Certain amines were found to be of value in the preparation of dry-cleaning soaps and cosmetics, and as general emulsifying agents. Many new plasticisers and solvents were also prepared and studies of their properties were conducted. In another research, diethylene glycol and triethylene glycol were found to have utility in lubricating and conditioning various textile fibers. It was clearly demonstrated that the ethanolamines and their soaps are valuable in the preparation of various types of emulsions used in textile lubrication, especially for such fibers as silk and rayon. The investigation of technical applications for the vinyl-type resins was also pursued throughout the year, and several new uses for these resins were found. It was learned that their unique properties make them especially suitable for moulding over metal panels and large metal inserts, for the flame-proofing of cloth, and for impregnating various kinds of materials in which resistance to chemicals and corrosion is of major importance.

The multiple fellowship, established by The Sugar Institute, Inc., in the fall of 1930, for broad research on cane sugar as a raw material for industrial purposes, has done much good work on some of the simple derivatives of sucrose. Of these compounds, sucrose octa-acetate, one of the oldest known esters of sucrose, shows properties suitable for use in lacquers, resins, films, adhesives, and paper finishing because of its solubilities and characteristics associated with its order of molecular weight.

With such promising results as these, it is not to be doubted that American industry is anxiously looking forward to the completion of Mellon Institute's new home which is expected to be ready for occupation in the summer of 1933.

"Television"

JUST at the moment when television broadcasts are to become a regular feature of the B.B.C. programmes Benn Brothers Limited, publishers of THE CHEMICAL AGE, have acquired the copyright of "Television." This monthly journal will now be vigorously developed as the leading authority on this remarkable science, which is on the threshold of a new era of progress. With the enormous resources of the B.B.C. providing broadcasts four evenings every week, television will rapidly become an indispensable feature of wireless entertainment. For nearly five years the need for official co-operation has been urged by this journal, which will now have the benefit of the Benn organisation behind it, ensuring all that is best in production, illustration, news and technical information. As the first television journal in the world, it already has a big connection among the pioneers of this science, and it is interesting to note that among the foreign readers are a large number of subscribers in Japan. In view of the rapid progress of wireless broadcasting it is safe to predict that television has a future that may well prove even more important The talkie has supplanted the silent film almost overnight, and television will supply the same vital element in the case of wireless programmes. The new issue of "Television" will commence in June, the rate of subscription being 13s. 6d. per annum, post free, from the publishers, Bouverie House, Fleet Street, London, E.C.4.

How to Benefit Humanity

CHEMISTS have been sometimes blamed for their share in the overproduction of commodities which the world at present is unable to consume. It may, therefore, be opportune to indicate, as Dr. E. F. Armstrong has done in our correspondence columns this week, other directions in which they can act as benefactors of humanity. One of these is concerned with the very ordinary subject of dust, which has become such a bugbear in the daily round of the housewife and is a greater menace to health than is generally realised. It is variously stated that the amount of dust actually settling per square mile per year may average 600 tons for an industrial city, and much larger figures have been recorded in bad areas. Smoke and flue dust are, of course, the two main sources of the evil; the former will continue until the burning of raw coal is prohibited

by law. The latter is definitely preventable and its discharge into the air should no longer be tolerated. It is true that the washing of the large quantities of gas produced at a power station presents many intricate problems of chemical engineering, involving a study both of corrosion by weak acids and of erosion by solid particles, together with the necessity of having intimate contact between the hot flue gases and the wash water. It should be possible by concentrated effort to make rapid progress in this direction. Perhaps we must aim further at providing the essential services, gas, power and steam, for our large cities from central stations instead of producing them in small units by each separate block of buildings, house or factory. Such an extension will bring with it problems of transmission by pipes through the streets, a direction in which there is much room for improvement. Success would at any rate obviate the constant transport of coal through the town with its concomitant dissemination of dust. Another source of dust which our correspondent mentions is by attrition in the highways but much of this has already been lessened by the use of road tar on the macadam and the advent of the rubber tyre. With rubber at its present price there is scope for its greater application as an anti-dust agent. We feel there is much in the suggestion that the whole question should be ventilated and that chemists have been far too apathetic in tolerating a state of affairs which materially affects for the worse the climate of greater London and other industrial centres, notwithstanding that the evil is to a large extent within our control.

Splitting the Atom

Dr. J. D. Cockroft and Dr. E. T. S. Walton, two young experimenters who have been working for some years on special apparatus erected at the Cavendish Laboratory at Cambridge under the direction of Lord Rutherford, have announced that they have succeeded in disintegrating an atom of lithium without the assistance of a radio-active substance. This, in view of Lord Rutherford, is a discovery of great scientific importance, although up to now the experiments have not yielded anything which will be of immediate commercial value. The atom has never before been disintegrated by a humanly constructed machine. Previous artificial disintegrations have been accomplished by putting atoms near naturally exploding atoms of radioactive substances. Dr. Cockroft has devised a machine which will produce atomic projectiles moving at speeds comparable with those of the particles ejected by naturally exploding atoms of radium. In principle it is of simple character. He arranges for a stream of hydrogen atomic nuclei (protons) to move under a powerful electric pressure obtained from transformers of the type evolved for very high tension distribution of electricity. He has harnessed the sort of transformer used in raising electricity to the voltage of the transmission lines one sees now being erected over England.

By arranging several of these in a row he may submit a stream of hydrogen atomic nuclei to a voltage up to 600,000. He finds that there is evidence of the disintegration of atoms of lithium when bombarded by protons moving under a tension of 125,000 volts and the number of disintegrations rises rapidly as the tension is raised up to 400,000 volts. Thus the atom of lithium may now be disintegrated merely by turning on switches. The disintegration is under a certain degree of control and is not made by applying the at present quite uncontrollable phenomena of radio-active disintegration. Dr. Cockroft's achievement brings the problem of atomic disintegration much nearer simple solution and provides a valuable new technique for the investigation of atomic structure. For the first time the agent of disintegration is under some control. Besides the advance in mastery over the forces of nature the new method of disintegration provides a much more flexible agent of atomic analysis. The experimenter will be able to grade the speed of his disintegrating projectiles just as he wishes and will be no longer restricted to the use of the projectiles of arbitrary speeds naturally provided by radium.

Lord Rutherford's Views

It has been stated that the Cambridge discovery means that it will be possible to produce an immense accumulation of added electrical energy for commercial purposes, but Lord Rutherford takes the view that so much cannot be claimed for the experiments up to the present time, for the simple reason that for every particle of additional energy obtained it requires millions of particles to make it effective. The experiments, however, are of great scientific interest and are likely to be powerful agents in extending our knowledge of the atom. Since 1919 it has been known that some of the lighter elements could be disintegrated or transformed by bombardment with very swift alpha particles. In general it has been found that the alpha particle has been captured by the nucleus of the atom and that one of the units of matter, the proton, is ejected at high speed. It has long been recognised that probably similar effects would be produced if atoms of matter could be bombarded by very swift protons or other light atoms. For this purpose a number of experimenters throughout the world have been at work on methods of producing high voltages in the laboratory in order to apply electricity to a vacuum tube to accelerate the particles which can be produced.

In this way it has been found that streams of swift atoms can be generated. The speed of the particles depends upon the voltage applied to the charged tube. Different types of insulation have been arranged to give voltages of about 1,000,000. Dr. Cockroft and Dr. Walton, in the Cavendish Laboratory, have been developing a special installation to apply 600,000 volts to accelerate the charged atoms. They have found that with a stream of swift protons applied to certain light elements, like lithium, boron, fluorine, and aluminium, a number of swift particles can be observed.

Energy liberated in the disintegrated atom has to be compared with the energy of the proton which causes this. This, however, does not mean that new energy has been created, for on the average only one in 100,000,000 particles which bombarded the matter is effective in producing the disintegration of the atom. These discoveries provided scientific men with a new and powerful means for throwing light on the structure of the elements, as it is probable when higher voltages are available these experiments can be pushed much farther.

The Iron and Steel Institute: Annual Meeting

Presentation of the Bessemer Medal

THE annual meeting of the Iron and Steel Institute which was held in London, on Thursday and Friday, May 5 and 6, discussed a more than usually interesting series of papers which at any rate serve to indicate that the charges of inefficiency, incapability and lack of science which are so frequently levelled against the iron and steel industry here, by those with little knowledge of the industry, and in circumstances where they cannot well be called to account, are distinctly unfounded.

One of the most interesting papers was a general description of the steel plant at the new Ford works at Dagenham, which some people have already had the advantage of inspecting. Whilst there may be a tendency to regard this plant as American in its inception, it is, in fact, based on knowledge accumulated from America and the Continent and as the contractors for the plant are a British firm, a great deal of satisfaction is to be derived from that fact. A feature of the plant is that it is laid out to use only imported ores which will have a higher content of iron than those to be found in this country and although the output is required for the manufacture of cars— and also, by the way, for the Ford tractor plant in Cork—there has been a feeling that the production will not be on what can be called commercial lines. In other words, it has been suggested that as a higher class product is required than that usually turned out by British foundries, the firm can afford to run at a higher working cost. That, however, is denied and it is alleged that the cost of the product at Dagenham is a thoroughly commercial one. The advantage, of course, is that the firm has been able —in this case, literally—to start from green fields, whereas the reconstruction of many of our works on a similarly modern basis involves a cost which the industry cannot afford. It was suggested in the discussion that the Government would have to come to the financial aid of the industry if we are to see it survive here. At the same time, even with our low grade ores, it is not generally appreciated that we are in this country turning out pig iron at a cost of production which compares favourably with any other country in the world except India.

Heterogeneity of Steel Ingots

The other outstanding feature of the meeting was the fourth report on the Heterogeneity of Steel Ingots. This has been prepared by a joint committee of the Iron and Steel Institute and the National Federation of Iron and Steel Manufacturers, and has been sent to the Iron and Steel Industrial Research Council. The work of this committee has proceeded without intermission since 1924, and such value have the reports attained that they are now regarded as standard compilations by the metallurgists of the world. There is now no steel company not only in this country but in the world which is not ready at all times to place ingots at the disposal of the committee for investigation. One point arising out of the work which the committee has done is the conviction that in spite of the statement so often made that this country must always be dependent upon imports for certain classes of steel, this is emphatically not the case, and Dr. W. H. Hatfield of Firth and John Brown, Ltd., who is the live chairman of the committee, stressed this point as fully as he could. The report is divided into seven sections, and although there were criticisms of what were regarded by some people as conclusions, but which the chairman was careful to point out were not, there was at the same time such a commendation of the work of the committee that its value cannot be impeached.

One issue of more than passing interest which arose on the report, although it does not strictly come within the work of the committee, is the problem of making an ingot mould which will stand up to 200 casts, as is the case on the Continent. The committee, of course, is more concerned with the effect of the ingot mould on heterogeneity but it is a point worth calling attention to. At the same time, the fault must not necessarily be laid upon the makers of the moulds; certainly in some cases it will be admitted a great deal of the trouble is due to the manner in which the moulds are arranged in the melting shop. What appears to be needed is a freer and franker co-operation between the mould maker and user.

Special attention was called to the section of the report on rimming steel, an exact definition of which, by the way, seems to be wanting and which the committee will endeavour to give in order to prevent the confusion that might possibly arise as the report stands at present. The report as a whole has demonstrated how, as we get to know more and more of the conditions arising in the manufacture of steel, we are forced to appreciate the complexity of the processes. The problems of oxygen and silicates, the distribution of silicates, ingot mould material, pyrometry as applied to liquid steel, the principles involved in the making of rimming steel and the thermal conductivity of ingot mould iron are all discussed in great detail.

The Canning Industry

"The Determination of the Porosity of Tin Coatings on Steel," by Messrs. D. J. Macnaughton, S. G. Clarke and J. C. Prytherch was a paper which dealt with a subject of peculiar interest at the moment by reason of the rapid advances that are being made in the canning industry in this country. The discussion gave an opportunity for the Welsh tinplate manufacturers to assert that the hot dipping process as practised in their works precludes any possibility of perforations, *i.e.*, the tin not completely covering the steel, as distinct from porosity, this particular trouble being alleged to be persistent with American tinplate. However, the solution of most of the troubles would appear to be a somewhat thicker coating of tin, but that costs money and a strong demand exists for sheets with a coating as thin as 9/100,000ths of an inch for certain purposes because of the lower cost. Therefore, the theoretical study of the actions that take place both during the process of tin-plating and afterwards under the influence of the foodstuffs which have been canned, is a subject to be encouraged.

Theories of corrosion of steel continue to be debated and some useful information on the subject was contained in a paper by Dr. G. D. Bengough and Dr. R. A. Lee. Dr. Bengough was prominently associated with the Corrosion Committee of the Institute of Metals during the many years this committee carried on a task now taken over by the Department of Scientific and Industrial Research. The present paper dealt with the action of sea water on mild steel and it has been determined that often one half of the corrosion in sea water is due to the evolution of hydrogen gas, the precise mechanism of the formation of which is still debated. An important practical point is the suggestion that the evolution of hydrogen in these circumstances may be a striking factor in determining the adhesion of paints on steel immersed in sea water.

Dr. A. Fry, of Essen, Germany, the inventor of the nitrogen case hardening process, made his first appearance in this country in presenting a paper on the subject.

The Bessemer Medal

On this occasion only one paper was taken as read in the absence of the authors, who were in Germany. Usually quite a number have to receive this treatment for lack of time but the programme this year was arranged with a due sense of perspective and each paper was suitably discussed without undue curtailment by the chairman.

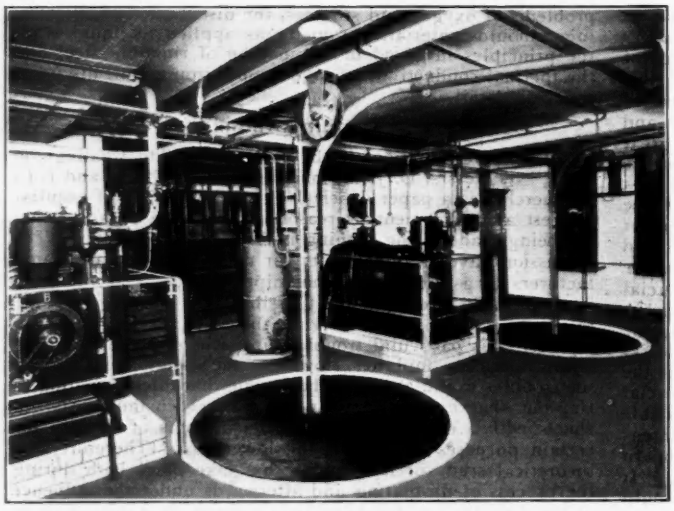
On the opening morning of the meeting, the Bessemer Gold Medal of the Institute was presented to Professor Henry Louis, whose association with the iron and steel industry for so many years is well known. In 1896 he was appointed to the chair of mining in Armstrong College, Durham, and to him belongs the credit of being the first to introduce elementary metallurgy and metallography as part of the curriculum of naval architecture and engineering, a step which other universities soon followed.

In a brief statement expressing his thanks, Professor Louis alleged that the fuel cost in the iron and steel industry in this country is 50 per cent. higher than it is on the Continent, and he urged greater attention to the preparation of the raw materials as the remedy for this.

Artesian Wells: Their Economic Importance to Industry

By L. A. IGGULDEN

A good supply of water is needed by almost every industrial and commercial undertaking in the world. Water is used in a great variety of ways, and in varying quantities by different industries; a few are able to make do with something like 1,000 gal. per hour, while others need supplies running sometimes into two millions or more every twenty-four hours. The various sources of water supply may be summarised as follows: (a) Companies' mains; (b) nearby rivers or streams; (c) surface springs; (d) shallow wells; (e) deep boreholes, or Artesian wells, as they are popularly termed.



A typical deep borehole pumping installation, showing two wells and duplicate air lift plants

Well drilling is an ancient industry, or art, one might almost term it, dating back many centuries before the Christian era; the exact origin is in fact lost in antiquity, but we do know that the ancient Chinese and Egyptians had very interesting, if somewhat slow, methods of making wells in search of brine and water, and various minerals.

Until the last hundred years or so, well drilling was not practised to any great extent in England. Country villages and estates were, in many instances, dependent upon dug wells for their only supply of water, but the wells were mostly very shallow, seldom reaching more than 50 ft. or so, and drawing supplies from surface deposits of gravels and sands, and sandy clays.

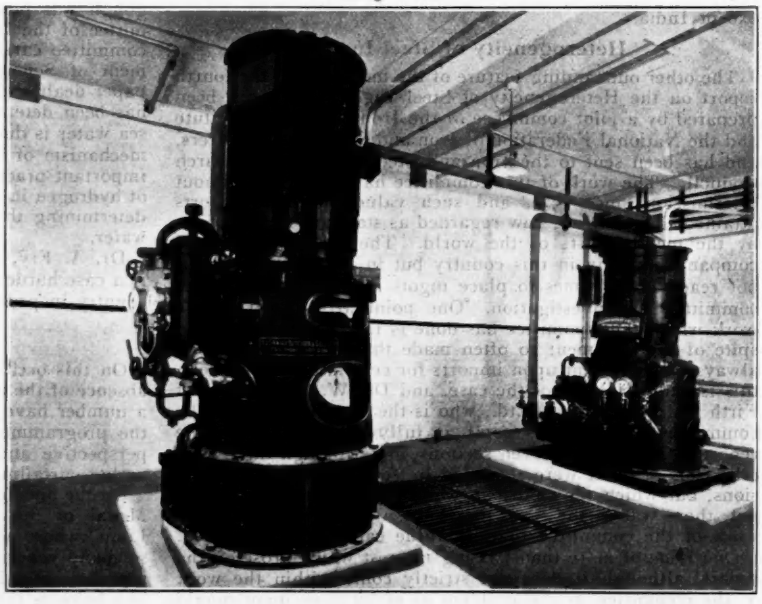
With the growth and expanse of towns and industries the problem of finding sufficiently large supplies of water for the ever increasing needs became an important matter, and thus it was that engineers and others, some hundred years or so ago, began to turn their attention underground as a possible source of water supply. The success they achieved has been astonishing, and as a result of nearly a century of well drilling, many millions of gallons of water are extracted hourly from underground sources. In a small number of instances shallow wells are still relied upon, but deep wells are now resorted to in the majority of cases, chiefly on account of the greater reliability of the supply, both from a point of view of quality and quantity.

The consumption of water in some industries probably runs into something approaching two million gallons per day, and this quantity, if taken from the water companies at say 1s. per 1,000 gal., represents £100 per day. This is not a fantastic figure; it is roughly what water costs some of the larger industries which are forced to take supplies from private water companies. Many industries do not, of course, use water companies. Several industries do not, of course, use anything like so much. In a few cases some may actually need more than this. A large manufacturing concern recently had to provide no less than four million gallons per twenty-four hours, and this has fortunately been obtainable from underground sources at about 6d. per 1,000 gal.—a very considerable saving. The all-in cost of maintaining a well system is nearly always cheaper than the charges made by the water companies.

Another instance may be quoted in which a manufacturer needing 30,000 gal. per hour, is pumping that quantity from a borehole in the chalk at a cost of 2d. per 1,000 gal. Thus, for a normal working day the cost is £2 10s. per day. The same quantity from the mains would have cost, at 1s. per 1,000 gal., £15 per day.

Still another instance will serve to illustrate the great advantage of a deep borehole, from the point of view of cost. Assuming that water is charged for by meter, at the rate of 1s. 6d. per 1,000 gal., and assuming the consumption to be a moderate figure, say, 30,000 gal. per 10-hour day, or, say, 10,000,000 gal. per annum, the charge by meter would work out at about £680. The capital cost of a borehole capable of yielding this quantity would be in the region of £1,500, and assuming a consumption of 3,000 gal. per hour for a 10-hour day, and electric current at 4d. per 1,000 gal., and allowing for interest on capital and depreciation of plant and general maintenance, the annual cost should work out at something like £280, thus:—

Interest on capital, say, £1,500 at 5 per cent.	£75
Depreciation of pumping plant only at 5 per cent.	£30



Duplicate vertical spindle borehole centrifugal pumps installed at a chemical factory in London suppyling 5,000 gal. per hour for each pump

Repairs and renewals, etc., (probably not necessary) ...	£25
Cost of pumping—fuel, say, electric current at 4d. per 1,000 gal.	£150
	£280

Such figures show an annual saving of round about £400, and the capital expenditure would be recovered in four years or so.

Drilling the Well

Some localities are not favourably situated, from a geological point of view, for the introduction of a borehole scheme, and supplies must in such circumstances be sought elsewhere. The matter must, in the first place, be considered from a geological or hydrogeological viewpoint. The particular area must be carefully studied with the aid of a geological map, to ascertain the prospects of a particular stratum yielding supplies. The study of hydrogeology is both interesting and informative, and much useful information may be obtained from a careful perusal of a 1 in. geological map and a district memoir. Great assistance can, however, be supplied by well specialists, who are in possession of vast numbers of records of other boreholes, and by comparing results of previous boreholes it is possible to tell, with reasonable accuracy, the possiblities of any site.

The writer has frequently been asked, "How is it possible to tell whether water will be obtained or not, and how deep to bore?" It will be realised that literally thousands of wells have been drilled in almost every county of the British Isles, and each well sinker or specialist has added a little more to the large accumulation of geological data, so that when a well is proposed at any new site, well specialists are particularly suited to advise. Much helpful information can also be obtained from the Geological Museum in London. In a technical article such as this it will not be possible to deal at length with one particular locality, but a good idea of ideal geological conditions may be obtained by a study of what is known as the London Basin, which is illustrated below.

Disappearance of Overflowing Supplies

There are, of course, a great many geological formations from which water may be obtained; speaking generally, the three greatest and most well-known in England are (1) the Chalk, (2) the New Red Sandstone, (3) the Lower Greensand. Sands, various gravels, limestones, shales, and sandstones, all yield water in varying quantities and qualities. Clays, marls and granite are, as a rule, unfavourable, but limited supplies may sometimes be obtained at various horizons in their mass. It is, of course, well known that the London Basin is supplied with water from the chief water-bearing formation in the South of England—the Chalk, which is sandwiched between the London Clay and Thanet Sands, and what is termed the gault Clay. Such conditions are ideal, and water of excellent quality may be had in large quantities in many places in and around London. Many large industrial concerns in the London area are dependent entirely upon deep boreholes for their water supplies.

When the first well were drilled into the London Chalk, it was quite a common occurrence for overflowing supplies to be obtained, but owing to the enormous demand upon the supply, the water table has fallen considerably in some parts, and overflowing supplies in London are now an unheard of phenomenon. In certain parts of the home counties, particularly in the Slough area, fine overflowing supplies from the Lower Greensand are still obtainable. It is interesting to record that the fountains in Trafalgar Square were originally dependent upon these true Artesian, or overflowing, wells for the supply; the overflow is now artificially produced.

There has been some discussion in the daily Press during the past few months regarding the failure of certain wells in the city of London, and whilst it is true that there are one or two areas which have been seriously affected by the increased demand during the past ten years, in the majority of cases deep wells in London are still giving excellent supplies. The water usually rises to depths varying between 200 and 300 ft. from the surface, and it is necessary to install some form of borehole pump to raise the water to the surface.

Sizes and Depth of Boreholes

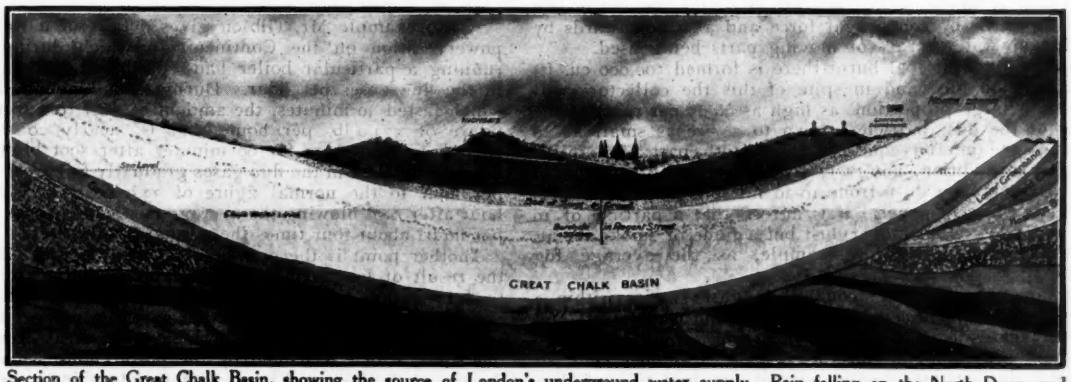
One of the principal features concerning a deep well installation is the actual quantity of water it is desired to pump. Upon this depends the diameter of the borehole, and also the depth. In London, for instance, a manufacturing concern needing, say, 10,000 gal. per hour, would doubtless need an 18 in. diameter borehole, drilled to about 550 ft. from the surface; a supply of 3,000 gal. per hour should be obtained from a 10 in. or 12 in. hole, and larger supplies would, of course, demand a larger diameter, but not necessarily deeper wells. Some of the water companies themselves are largely dependent upon wells 6 ft. or more in diameter.

The procedure in drilling a borehole is extremely interesting and calls for great skill on the part of the drilling crew, particularly nowadays, when so much care and attention is given to produce a first class engineering job. Verticality is of great importance, because a certain type of pump, which has now been on the market for several years, will not operate successfully in a crooked borehole, and it is now incumbent on all reputable well specialists to pay great attention during the drilling to set and maintain the steel lining casing in a truly vertical position. A limit of deviation 1 in. in 100 ft. is frequently set by some engineers.

Boreholes as a rule are lined with steel casing of the required diameter. This casing serves a two-fold purpose, (a) to prevent the sides of the well from collapsing, and (b) to prevent unsuitable surface waters from reaching and contaminating the purer waters which are invariably situated at greater depths. London boreholes, for instance, are lined down to and 10 ft. into the chalk, into which the bottom of the casing is tightly sealed. Thus the whole of the upper waters are shut out, and the pure chalk water alone is drawn upon. Some extremely interesting wells have been drilled, but space will not permit us to go more deeply into the many features.

Increasing Supplies from Boreholes

Recent years have seen the introduction of some ingenious methods in the art of developing supplies from boreholes. In some cases wells have, for various reasons, failed to maintain their original output. Probably it is desired to increase the supply, and provided the water is actually in the strata beneath a particular site, this may be achieved by several



Section of the Great Chalk Basin, showing the source of London's underground water supply. Rain falling on the North Downs and Dunstable Downs percolates through the chalk and replenishes this natural underground reservoir

methods. One solution is to drill another well, preferably at some distance from the existing one, to avoid affecting the supply to the other, and a careful examination should be made to ascertain the most suitable part at which to drill. Existing wells may also be enlarged or deepened, or they may merely require cleaning out—a process known as shelling. The effect of this is to remove the accumulation of perhaps years, and thus permit the water to flow freely once more.

A still later method, which is extremely interesting and novel, and particularly successful in the chalk formation, is the drilling of what are termed "deflected" boreholes, *i.e.*, branch holes at various angles from the main borehole. By carefully consulting a detailed section of the strata penetrated, it is possible to locate suitable portions from which to operate, and by means of a specially designed piece of apparatus the drilling tools are made to drill at an angle, the effect being to cut more and more fissures, and thus permit a greater quantity of water to flow into the borehole. A well-known water company in the South of England dependent on boreholes, recently succeeded in doubling its supplies for three boreholes by this method.

Some extraordinary results have been obtained during the last few years by means of deflected boreholes It has even been found possible, by extremely careful calculations and drilling, to connect two boreholes together, 400 feet beneath the surface, with very satisfactory results.

Characteristics of Deep Well Waters

It will be appreciated that scarcely any two boreholes yield the same quality of water, and space prohibits the publication of details of more than one or two typical well waters such as are in daily use. The first analysis is of a typical water from a borehole 50 ft. deep in London—the water coming from the chalk. Results expressed in parts per 100,000 :—

Turbidity—Slight white opalescence and deposit of chalk.
Colour—Normal.
Reaction *pH*—Very faintly alkaline 8.5.

Total solids 180° C.—	77.0
Chlorine in chlorides—	11.5
Nitrogen in Nitrates—	0.06
Nitrites—	Absent
Hardness : Permanent—	0.5
Temporary—	10.5
Total—	11.0
Free Ammonia—	0.0320
Albuminoid Ammonia—	0.0016
Oxygen absorbed in 3 hrs. at 37° C.—	0.0050

Such water is perfectly suitable for domestic uses, but is likely to exert a corrosive action on boilers, particularly the high pressure type, and softening in some form would be necessary.

A further analysis will be given of a Lower Greensand water from a borehole 1,033 ft. deep :—

Total solids—	33.5
Chlorine in chlorides—	4.2
Nitrogen in nitrates—	Nil (Nitrites absent).
Hardness : Permanent—	0.0
Temporary—	11.0
Total—	11.0
Metals Minute traces of iron	0.03
Free ammonia—	0.0220
Albuminoid ammonia—	0.0012
Oxygen absorbed in 3 hrs. at 37° C.—	0.0250

Space will not permit entering further into the many interesting features concerning the various types of pumping units which are available. The particular type to be installed will depend on the actual conditions of the borehole which generally are known only on completion of the drilling and testing. It is usual to test new boreholes thoroughly, and manufacture the pumps to suit the particular characteristics which reveal themselves during such testing.

Deep boreholes have certainly come very much to the fore during recent years, particularly as executives have realised the enormous advantages to be derived from the possession of what amounts to a private waterworks.

We are indebted to Le Grand, Sutcliff and Gell, Ltd., of Southall, for the loan of the illustrations in this article.

Dust and Sulphur Fumes from Power Stations

Latest Scientific Principles

THE great advance that has been made in the solution of the problem of dust elimination from large volumes of combustion gases was well indicated by a recent paper read by Mr. J. W. Gibson before the London Technical Group of the Electrical Power Engineers' Association. This dealt with the problem of both dust and sulphur fumes from the theoretical and practical aspects, as well as giving a description of the centrifugal dust collector of Davidson and Co., Ltd., of Belfast, of which firm Mr. J. W. Gibson is the London director.

This was introduced only a few years ago, and nearly 100 different power stations are now equipped in various parts of the world, the basic principle being the use of a horizontal casing of volute shape through which the combustion gases pass to the chimney, so that the dust particles are continually urged upwards by centrifugal force and also downwards by gravity, no water sprays or moving parts being used.

For every ton of coal burnt there is formed 500,000 cu. ft. of combustion gas, and in spite of this the collectors will separate a large proportion, as high as 90-95 per cent. of the whole of the dust particles, down to a size as small as 20 microns (one micron equals a thousandth part of a millimetre). In addition, however, an appreciable proportion of the extremely fine dust from 10-20 microns in sizes is also removed, while in general it is agreed that a particle of 10 microns or less is no longer dust but a fume or smoke, being about the same size, for example, as the average fog particle.

The amount of dust in combustion gases varies within a range of 0.25-15 per cent. by weight of the coal burnt, and in many cases is between 5-10 per cent., and since these collectors are removing on the average 85-95 per cent. of the total dust in many cases several hundred tons of dust per week are being recovered. The most striking new advance is that these collectors are being fitted on the suction side of the induced draught fans so as to prevent the serious problem of fan erosion, which up to now has been insoluble, caused by the sand blast action of the particles in the combustion gases due to the very high water gauges, often up to 10-16 in. demanded to-day. The first two power stations in the world to be equipped on these lines are the new Iron Bridge (Shrewsbury) and Dunston (Newcastle-on-Tyne) now in course of construction.

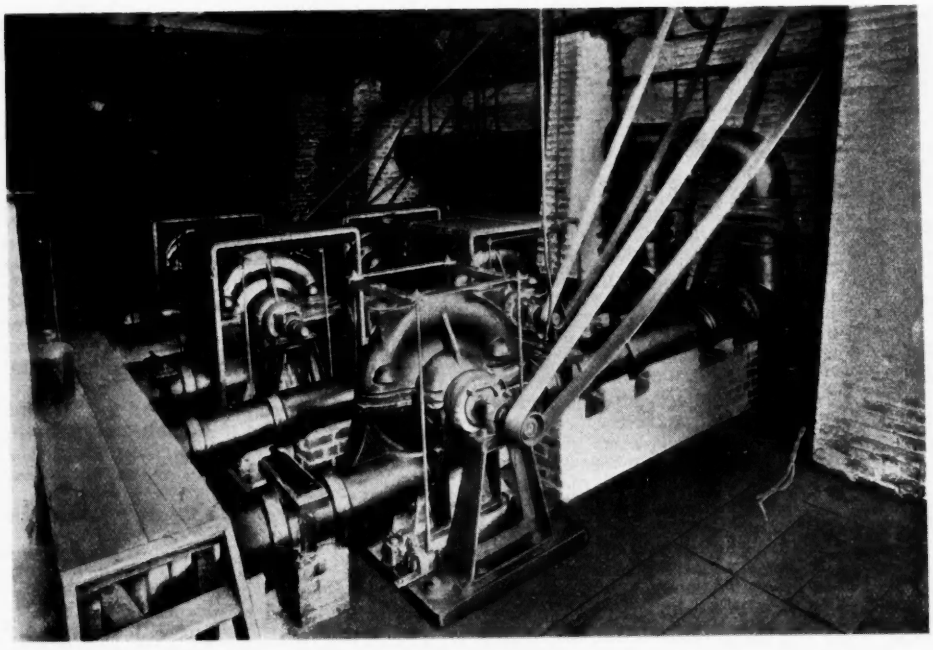
Another striking point in the paper concerns the large amount of dust discharged from power station chimneys during soot blowing, and the centrifugal type of collector is particularly valuable in this connection, since the efficiency of separation does not fall off with a great increase in the amount of dust.

As an example Mr. Gibson gives details of a well-known power station on the Continent, in which during normal running a particular boiler had 33.0 lb. of dust passed out in the flue gases per hour. During soot blowing, however, which lasted 30 minutes, the amount of dust rose to the huge figure of 573.0 lb. per hour, that is, nearly 20 times the normal figure. Also for 60 minutes after soot blowing had finished the dust in the flue gases gradually fell from 220.0 lb. per hour to the normal figure of 33.0 lb., that is, for one hour after soot blowing the average dust content was 126.0 lb. per hour, about four times the normal figure.

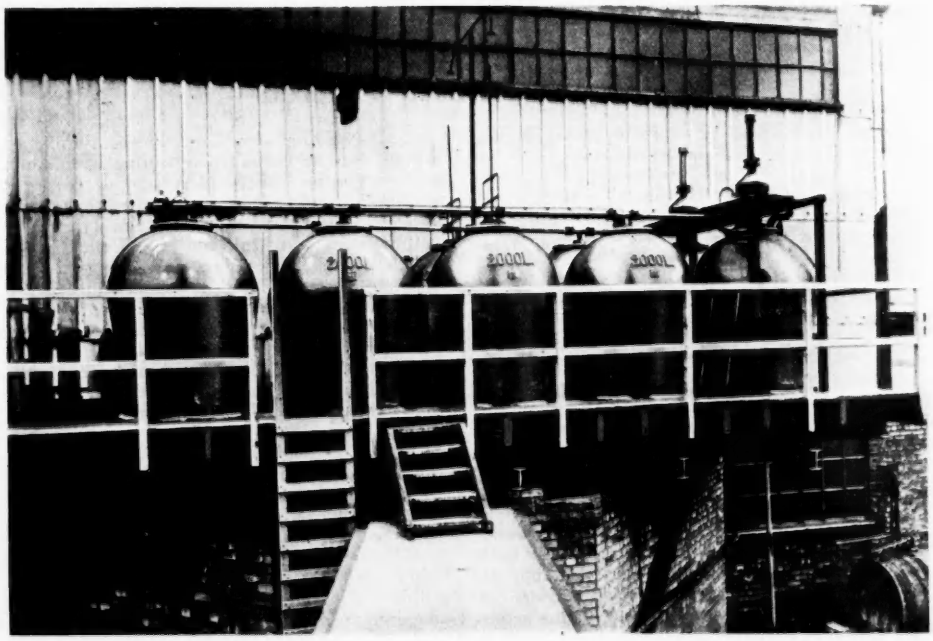
Another point is the opinion expressed by Mr. Gibson, as the result of long experience, that much of the trouble due to fumes and sulphur from power station is because the chimneys are too low, so that the gases do not get a chance to be uniformly distributed over a wide area. Essentially the wind, which is baffled by the power house, jumps over the top of the hoof and tends to descend again to the ground level on the leeward side.

Acid-Proof Chemical Stoneware

Some Typical Examples



Acid-proof chemical stoneware is now employed in the construction of exhausters for handling corrosive gases. This illustration shows a typical installation at a modern chemical works. Similar exhausters are used to a large extent for removing the acid vapours evolved in acid dipping operations at tube, wire and sheet metal works. (L. A. Mitchell, Ltd., Manchester)



A typical acid storage installation in which vessels made of acid-proof stoneware are used in place of tanks or similar receptacles. The vessels in this installation have individual capacities of 2,000 litres (about 440 gal.). They are inter-connected by a system of syphon pipes which allows the acid to equalise its level throughout the battery whenever a fresh supply is passed into storage or when acid is drawn off for use in the works. (L. A. Mitchell, Ltd., Manchester)

Letters to the Editor

The Editor welcomes expression of opinion and fact from responsible persons for publication in these columns. Signed letters are, of course, preferred, but where a desire for anonymity is indicated this will invariably be respected. From time to time letters containing useful ideas and suggestions have been received, signed with a nom-de-plume and giving no information as to their origin. Correspondence cannot be published in THE CHEMICAL AGE unless its authorship is revealed to the Editor.

The Chemist and the Dust Nuisance

SIR,—It would appear to be almost anti-social at the moment for the chemist to invent new processes, or improve existing ones, for the manufacture of unsaleable commodities. Let me suggest, therefore, that he turn his attention to dust, tackling the problem from both its aspects, namely, the prevention as far as possible of its formation, and the invention of new methods for its removal.

If I may deal with the latter first, what is required is an extension of the principle of the vacuum cleanser, so that our household dust is removed and not merely dislodged to settle again elsewhere. A duster in the form of a glove into the inside of which the dust is sucked, a sweeping broom which consumes its own dust costing very materially less than the existing electrically driven sweepers are desiderata of the very highest order for the home. It should be possible perhaps to charge electrically an absorbent and pliable surface to which dust would adhere, releasing it into a receptacle when the charge was cut off or reversed. No doubt your readers can suggest other practicable methods but we must seek to remove our dust and not merely to redistribute it.

Much can be written on the subject of the prevention of dust formation—the use of rubber tyres and roadways to minimise the production by attrition seems to offer scope for the chemist's inventiveness. I hesitate to talk of the smoke nuisance or of its first cousins, flue grit and sulphurous gases, though I must confess, at the end of an unusually dreary London winter, to the belief that it would make for a better—or at least a brighter—world if the Royal Society took again more interest in such questions as they once did in the days of Evelyn. If I kept such a diary to-day as he did it might read "went in fog and heavy gloom to Piccadilly to hear a discourse on the neutron, noticed how rapidly the stonework was decaying!"

We have a quiet year in front of us; can we not profitably use it for the mitigation of the dust nuisance?—Yours faithfully,

E. F. ARMSTRONG.

King's Court,
48 Broadway,
Westminster, S.W.1.

Anthracene Oil

SIR,—I desire to purchase a quantity of refined anthracene oil, and I shall be glad if any of your readers can assist me to obtain the particular quality I require. I am familiar with the ordinary greenish anthracene oil, but that is not what I need.

I remember seeing at a chemical exhibition some time ago a sample phial of clear water-white anthracene oil, but I am unable to trace who produced it, or to ascertain the current price. I could do with a considerable quantity of the oil if it is obtainable at a reasonable price.—Yours faithfully,

"MACHINERY AGENT."

[We shall be glad if producers of the class of oil to which our correspondent refers will send us the necessary information, in order that we may pass it on to him.—ED., C.A.]

Sub-Oxide of Lead

SIR,—I notice in some of the American papers it is claimed that sub-oxide of lead was used with an oil binder for painting more than 25 years ago. I believe it was used in this country some time before then.

I wonder if any of your readers could tell me when this form of paint was first used.—Yours faithfully,

T. C. MINERS.

14 Hamilton Gardens,
London, N.W.8.

Society of Public Analysts

New Members Elected

AN ordinary meeting of the Society of Public Analysts was held at the Chemical Society's Rooms, Burlington House, on May 4, Mr. F. W. F. Arnaud, president, being in the chair. Certificates were read for the first time in favour of C. C. Marginson, W. Mather, A. D. Mitchell and M. Niyogi; and for the second time in favour of R. H. Hopkins and W. B. Walker.

The following were elected members of the Society: E. B. Anderson, E. F. Eaton, F. Maudsley, S. G. Stevenson and J. W. Thom.

Four papers, of which we give abstracts, were afterwards read and discussed.

"The Separation of Tantalum, Niobium, Titanium and Zirconium, and a new Analytical Grouping," by W. R. Schoeller and A. R. Powell.—The authors' recent method for the separation of titanium from zirconium, based on precipitation of the titania as tannin complex from the nearly neutralised oxalate solution half-saturated with ammonium chloride, has now been proved to afford a quantitative separation of tantalum, niobium and titanium ("acid tannin group") from zirconium, thorium and aluminium ("basic tannin group"). Under the conditions realised by the procedure, tannin acts as a group reagent, precipitating any or all of the members of the acid tannin group, thus separating them from any or all of the members of the basic tannin group. The inclusion of certain other metals, *e.g.*, uranium, in the last-named group is being investigated.

"The Iodine and Thiocyanogen Value of Irish Butter," by P. S. Arup.—The iodine value of Irish butter fat rises from May to October and then falls again, owing mainly to the influence of the winter feeding factor. The thiocyanogen value (affording a measure of the linolic acid) is higher in winter than in summer, indicating a tendency for the linolic acid to increase as the oleic acid decreases. The proportion of linolic acid in the unsaturated fatty acids in Irish and foreign butters ranged from 9.1 to 13.2 per cent.

"Sediments in Ink and in Writing," by C. Ainsworth Mitchell and T. J. Ward.—The causes of the formation of sediments in inks and their identification in writing have been studied. The effects of excess of iron, of tannin, and of gallic acid are clearly indicated. Among the external causes producing sediments recognisable in writing are alkali in glass moulds and extraneous substances such as dust, vegetable débris and starch, and the evidential value of such deposits is discussed. A new method of detecting oxidase in moulds, etc., has been based on the acceleration of the oxidation of a solution of tannin and ferrous sulphate by the substance containing the oxidase, the resulting precipitate of basic ferric tannate being collected and weighed.

"The Determination of Minute Amounts of Copper in the Presence of Iron and certain other Metals," by L. G. Haddock and Norman Evers.—It is shown that the separation of copper from iron by means of ammonia or hydrogen sulphide is incomplete. An accurate method consists in keeping the ferric iron in solution by addition of citric acid and ammonia, adding sodium diethylthiocarbamate (Callan and Henderson), extracting the solution with carbon tetrachloride (Grindel), and measuring the colour of the extract in a tintometer, or comparing it with standards containing known amounts of copper. As little as 0.005 mgrm. of copper may be detected in the presence of 0.25 grm. of iron.

Extraction of Phosphorus from Coke Ash

A Joint Meeting at Newcastle

A JOINT meeting of the Newcastle Section of the Society of Chemical Industry, the Northern Section of the Coke Oven Managers' Association and the North-East Section of the Institute of Chemistry was held at Newcastle on April 29, when a paper on "The Determination of Phosphorus in Coke. Part I—The Extraction of Phosphorus from Coke Ash" was presented. The paper was read by A. H. Edwards, Dr. C. B. Marson and Professor H. V. A. Briscoe. Dr. J. T. Dunn was in the chair.

The authors stated that while it was generally held that established methods in use for the determination of phosphorus in iron ore, limestone, pig iron, and steel gave accurate results, there was equally general agreement that the position with regard to the determination of phosphorus in coke was unsatisfactory. This view had been clearly expressed by the British Standards Institution, which had found itself unable to recommend a method "until the subject had received much fuller and closer attention." Many different methods were in use for the determination of phosphorus in coke and most of them, although hitherto regarded by their users as reliable, were now found to be subject to serious error. It was, therefore, not surprising that disputes on this point between buyers and sellers of coke were not infrequent. There was, evidently, strong justification for a careful and comprehensive study of these methods with a view to establishing a standard test.

The fact that no general dissatisfaction was felt with the methods available for the determination of phosphorus in materials other than coke immediately suggested that the difficulties with this material lay rather in the extraction than in the determination, and since preliminary experiments gave much evidence that the several methods differed mainly in their effectiveness in extracting the phosphorus, the authors had, in the present work, concentrated attention mainly on that point.

A Standard Test

Examination of nine different methods for the determination of the phosphorus content of 57 different coke ashes showed that seven of these methods gave low results compared with those given by the remaining two. Systematic examination of the residues normally rejected in the course of the determinations indicated that the cause of the discrepancies, where the result was low, was that these residues contained the missing phosphorus. Evidently most of the methods at present in use were open to the criticism either that the phosphorus was not completely extracted from the ash or that precautions taken to remove titanium also removed phosphorus.

The authors suggested that French's method of extraction should form the basis of a standard test for phosphorus in coke on the grounds both of accuracy and speed. This method is as follows: The requisite quantity of ash is slowly digested in a platinum crucible with 5 c.c. of hydrofluoric acid and 10 c.c. of nitric acid. The solution is evaporated to dryness (but not ignited) and the digestion and evaporation repeated with the same quantities of acids. Fifteen c.c. of nitric acid, d 1.2, are added to the residue and the contents of the crucible are evaporated to a low bulk. The solution is transferred to a beaker, diluted with water, boiled, and filtered. The filtrate is evaporated to 50 c.c. neutralised with ammonia, the precipitate just dissolved in concentrated nitric acid, 4 c.c. excess of nitric acid added, and the phosphorus determined by the volumetric phosphormolybdate method already described.

They also suggested that the Northern Coke Research Method might conveniently be used as a check or alternative method. In this test the requisite quantity of ash is fused with 4 g. of fusion mixture in a platinum crucible. The crucible when cold is placed in a 6-inch evaporating basin and covered with water, and 15 c.c. of concentrated hydrochloric acid are added. When the melt has dissolved the crucible is removed from the dish, 5 c.c. of concentrated nitric acid are added, the solution is evaporated to dryness and the residue baked on the hot plate for 1 hour. Then 5 c.c. of concentrated nitric acid and 50 c.c. of hot water are added, and the solution is heated to boiling point, filtered through a Whatman No. 31, or similar, paper, which is subsequently washed until free from chlorides. The bulk of the filtrate should not exceed 250 c.c. To it ammonia is added until the hydroxides are just precipitated, and then the precipitate is just dissolved up with a few drops of concentrated nitric acid. The solution is evaporated to about 70 c.c., 5 c.c. of concentrated nitric acid are added, and the phosphorus is precipitated as ammonium phosphomolybdate and treated as described.

The authors emphasised the necessity of making blank tests on all reagents employed. They were aware that these methods might give anomalous results in certain cases. Further on such cokes, more especially with reference to the influence of interfering elements such as titanium, was in progress, but in the meantime they believed there was already sufficient evidence to justify the adoption of the two methods described as standard methods for the extraction of phosphorus from coke ash.

Points from the Discussion

The CHAIRMAN said he could not but admire the tremendous amount of work which had been put in and the results appeared to be very conclusive. It was of the greatest importance that it dealt with cokes for all purposes. A feature was the care with which different methods had been examined and residues rejected at each stage. It seemed that French's method was preferable for fewer operations and shorter time.

Mr. N. D. RIDSDALE recommended the use of benzoic acids for the standardisation of the solutions. It was most necessary to standardise the conditions of the precipitation, otherwise the precipitate was impure. He had found that the presence of ferric nitrate prevented molybdic acid contamination.

Dr. JONES said they could have nothing but sincere praise for the work which had been carried out, but the curtailment of the tables in the printed paper meant that a true indication of the enormous amount of work was not given. He regretted that the large and complete table could not be published. Was the difficulty of extraction related to the chemical and physical properties of the ash? Was the temperature of ashing of any importance, for example, different muffles in different laboratories?

Professor G. CLEMO asked what was the form in which the phosphorus appeared in original coal.

Professor BRISCOE replied that he really could not say, for they did not know. He thought that a statement from the meeting to the effect that the full and complete table might be published would be helpful.

Mr. EDWARDS said that Mr. Ridsdale's conclusions as to the effect of ferric nitrate were rather different from those of Kitajima, who had shown that unless the proper proportions of ammonium nitrate were present, ferric nitrate retarded the precipitation of ammonium phosphomolybdate.

Chemical Matters in Parliament

Oil Extraction

IN the House of Commons on May 10 Mr. Alexander Ramsay (West Bromwich) asked the Secretary for Mines if the method of reducing coal to oil by the process of hydrogenation can now be regarded as on a commercial basis; and if His Majesty's Government propose to take any steps to develop the use of this process in the interests of national economy.

Mr ISAAC FOOT replied that at the present level of prices of petroleum products, and with the exemption from the duty on motor spirit granted to petrol made from indigenous sources, it would be possible in a large commercial sized plant to produce motor spirit from coal at a profit. Such a proposition obviously needed close detailed examination. Consequently as regards the second part of the question, he was not able to add anything to what he said in his speech on May 3 during the debate on the Mines Department Vote.

Death of Sir Thomas Legge

Former Senior Medical Inspector of Factories

WE regret to record the death of Sir Thomas Morison Legge, for nearly thirty years senior medical inspector of factories at the Home Office, which occurred at Winter Green, Warlingham, on May 7. Sir Thomas, who was 69 years of age, was well known in the chemical industry through his work in connection with factories, and he had a large share in the attainment of the present level of industrial health which distinguishes this country. He not only contributed substantially to the study of occupational diseases but was associated also with every movement that promised improvement in the field of industrial health. After he retired from the Home Office he became medical adviser to the social insurance section of the Trades Union Congress.

Sir Thomas Legge was born at Hong Kong in 1863 and was appointed senior medical inspector of factories in 1898, having previously served as secretary to the Royal Commission on Tuberculosis. The Workmen's Compensation Act was then in its early operation, and among other activities he sat on committees dealing with compensation for industrial diseases, anthrax, and the painting of buildings, and conducted inquiries into the effects of dust, fumes and gases.

He retired from the Home Office in 1926, and joined the staff of the Trades Union Congress in 1930. Since that time his work has been primarily in connection with the prevention of industrial diseases and forms of poisoning. By articles and lectures he also sought to keep the trade union movement informed of medical progress in occupational diseases and of the question of health in industry.

The Austrian Magnesite Industry

Research Activity

THE total Austrian output of raw magnesite, crystalline and amorphous, during 1931 is estimated at 179,440 metric tons, compared with 304,396 tons during the preceding year, a decrease of 41 per cent. More than 83 per cent. of the 1931 output—148,840 tons, chiefly of the crystalline variety—was produced by the two leading companies. A considerable number of shares of one of these companies, the Veitscher Magnesitwerke A.G., formerly held by a leading Austrian bank, were sold to a foreign group during the year, and other important changes in ownership of domestic magnesite companies were reported.

Since dead-burnt magnesite was produced in 1931 only by the two leading companies, their combined total output of this variety, 38,799 tons, represents the total Austrian production for the year, a decrease from the 1930 figure of 124,226 tons burned. Veitscher was responsible for 25,799 tons of the 1931 production. Production of caustic calcined magnesite showed an upward trend in 1931. The total output is estimated at 34,760 tons, compared with 20,500 tons in the preceding year, an increase of 18 per cent. More than 63 per cent. of the total was produced by one company. In 1931, 23,817 tons of magnesite brick were produced as compared with 41,083 in the preceding year. The dead-burnt magnesite from which they were manufactured is included in the production statistics for that variety.

Increase in Raw Magnesite Exports

Austrian exports of raw magnesite, insignificant in previous years, increased markedly in 1931 to 1,351 tons, an advance of 235 per cent. over the 1930 shipments. These exports went chiefly to German border districts. Exports of dead-burnt magnesite came to 27,491 tons in 1931, compared with 58,039 in 1930, a drop of 53 per cent. This decline is attributed to a reduced demand on the part of the iron and steel industries in most countries. The United States took 60 per cent. of the exports in this class during the fourth quarter of 1931. Shipments to America were considerably below the 1930 level throughout the year, but in the fourth quarter were much larger than in any preceding quarter in 1931. Exports of caustic calcined magnesite did not decline quite so much as those of dead-burnt magnesite, but the decrease amounted to almost one-third. The total for 1931 was 18,404 tons compared with 26,882 tons in 1930. There was no material change in the direction of these shipments. The leading markets were Germany, which took 45 per cent.; France, 26 per cent.; and Czechoslovakia, 18 per cent. No exports to the United States were recorded in 1931.

Depression in Industry

Export prices differed slightly according to market conditions, but, upon the whole, prices showed a gradual downward trend throughout 1931. There are price agreements between the magnesite plants producing caustic calcined magnesite so far as sales to Germany are concerned. A pronounced decline of general activity during the year seriously affected the Austrian magnesite industry, and the overhead expense per unit of output increased in proportion to the decline of production. Notwithstanding the continuous shrinkage of business during the past two years, the leading Austrian magnesite companies maintained their dividends on a level of from 12 to 18 per cent. of par value. They were in a position to follow this policy because they had reserved some of the large net profits made in prosperous years and because of a very large export business. It appears unlikely, however, that dividends for 1931 will be maintained. The unfavourable conditions in the industry also find expression in a decline of the market value of stocks of the magnesite companies.

First Aid Training in Industry

Plea for More Modern Methods

A STRONG plea for a more specialised training for first-aid in industry was made by Dr. T. E. A. Stowell, chief medical officer to Imperial Chemical Industries, Ltd., at the National Safety Congress at the Caxton Hall on May 6. At present, he said, training for first-aid in factory and works accidents was largely governed by methods catering for the unexpected accident at the roadside or in the hunting field, and not of the type with which industrialists were most concerned. In a properly equipped modern factory no accident should occur for which the ambulance organisation was unprepared. There was no room in industry to-day for any but the most efficient treatment possible. Loss of life or limb, not to mention unnecessary pain and suffering, might result from inadequate first-aid treatment.

Dr. Stowell showed that the accepted teaching was practically valueless for the proper treatment of wounds and abrasions. One example he quoted was the present first-aid teaching for hæmorrhage which was so inadequate that he had been horrified to find that less than 0.5 per cent. of experienced first-aiders knew how to apply digital pressure to the femoral artery, hæmorrhage from which is fatal in a few seconds. Ambulance teams were taught so much about bandages and splints that they were apt to ignore the danger of shock. Dr. Stowell said that he had found in examining teams trained on orthodox lines that treatment of shock was usually left until the patient was dead.

He told a romantic story of how a surgical appliance, the Thomas splint, was designed in 1870 by a Liverpool surgeon. For 44 years this device was looked on either with scorn or mild amusement by the medical world. Yet in 1914 when the lightnings were loosed on the world of surgery the splint came into its own. In the early days of the war the death-rate from compound fracture of the thigh was 82 per cent. When the Thomas splint was introduced for general use as a first-aid appliance in 1917, the death-rate from these injuries dropped to 12 per cent. To neglect to teach ambulance men the use of this splint was to be guilty of culpable homicide—yet it was not included in the present first-aid syllabus. And this in spite of the fact that it could be applied by one trained man, helped by an untrained assistant.

Times had changed since the existing teaching had been evolved. A more specialised training was now essential. The only satisfactory solution was for practising surgeons familiar with industrial conditions to get together and produce a new manual of industrial first-aid. The Industrial Welfare Society had at its command many works doctors of ripe experience who could produce such a book, the cost of which was estimated at £2,000. The subscription of this sum by the industries of the country would not only be a sound economy, but a most profitable investment, and Dr. Stowell appealed to industry to make the production of a really comprehensive manual of first-aid possible without delay.

News from the Allied Industries

Pharmaceutical Products

THE British Drug Houses, Ltd., announce that pure crystalline vitamin D, formerly offered for the use of research workers, is now available for general clinical use in the form of Radiostol Solution and Radiostol Pellets. The solution is a tasteless solution in oil of the pure crystalline vitamin and its vitamin D activity is such that one fluid ounce of the solution is equivalent to 50 fluid ounces (2½ pints) of good cod liver oil. The pellets contain the pure vitamin incorporated in cocoa butter. One pellet is equivalent to a full adult dose of cod liver oil.

Iron and Steel

REPRESENTATIVES of the iron and steel industry are to go to the Ottawa Conference. The delegation will be led by Mr. A. J. Grant, managing director of Thomas Firth and John Brown, Ltd., Sheffield, and president of the National Federation of Iron and Steel Manufacturers, who will be accompanied by Sir William Larke, director of the National Federation, as his deputy. The delegation is not quite complete, but it has been decided that the following will be members: Mr. Julian Piggott, manager of the British Steel Export Association; Mr. Fred Smith, Templeboro Rolling Mills, Ltd.; Mr. George Smith, the Firth Co., Ltd.; and Mr. Geoffrey Summers, John Summers and Sons, Ltd.

Paper Making

IT is rumoured that the extensive works at Stoke-on-Trent, formerly carried on by Kerr, Stuart and Co., Ltd., locomotive builders, may be used for the manufacture of paper. The works have been unoccupied for about two years. For some weeks a special committee of the Stoke City Council has been in negotiation with a London firm of solicitors acting for a syndicate, which, it is understood, will shortly make a public issue of capital in connection with the proposed new concern. The paper-making factory, it is understood, would provide employment for between 1,500 and 2,000 people. One of the conditions of establishing the works at Stoke is believed to be that the council shall provide, at a cost of £30,000, to be repaid in annual instalments by the company, a pipe for conveying water a distance of seven or eight miles from Stanley Pool. A huge quantity of water would be required. The suitability of water in the district was a strong factor in inducing those connected with the new concern to consider setting up works in the Potteries. The corporation is in negotiation with other firms for the establishment of new industries in the district, and it is hoped that at least two new works will be erected in the city in the near future.

Paint Manufacture

PRESIDING at the first annual meeting of Goodlass Wall and Lead Industries, Ltd., in London, on May 6, Mr. Clive Cookson, chairman of directors, said the abandonment of the gold standard by this country had undoubtedly assisted the company, as had the tariff measures recently introduced by the Government. The company had established its own factory in Buenos Aires, where the brands of Goodlass Wall and Co. had had for many years a great goodwill value which it would have been a mistake to allow to be squeezed out by rising tariffs and the competition of local paint manufacturers. The factory was of the most modern design. It had commenced production early this year, and although conditions in the Argentine arising subsequently to the decision were not as advantageous for establishing a new factory as previously, reports received were definitely encouraging. Necessarily the branches of the company's business which operate in three foreign countries were dependent for their success primarily on conditions existing in the various countries. A considerable amount of work had been done in the year with the aim of reducing factory costs. Improvements had been made in the company's quick process of white lead manufacture, improved methods for the manufacture of sheet lead had been applied, and the system of transport in the chief London factory had been completely transformed, while at Liverpool they were now engaged in the rebuilding and reorganisation of the varnish plant. Various new products also had been examined and put on the market.

Artificial Silk

ATLAS Artificial Silk Processes, Ltd., has filed particulars of debenture stock for £100,000 (power being reserved to increase up to £200,000), authorised March 3, 1932, and covered by a trust deed of the same date, the amount of the present issue being £100,000. The property charged is freehold and leasehold property at Littleborough and Stubley, Lancashire, and the company's undertaking and other property, present and future, including uncalled capital—subject to debentures (a) dated March 3, 1932, and (b) dated June 2, 1930. The trustees are F. Murgatroyd, Duchy Chambers, Clarence St., Manchester, and three others.

Pottery

DAMAGE estimated at £20,000 was caused by a fire which destroyed part of a pottery factory belonging to Cartwright and Edwards, Ltd., one of the largest concerns in the district, at Longton, Stoke-on-Trent, on May 3. The 400 operatives employed at the works will be temporarily out of work as a result of the fire. Forty of these, all girl workers who are employed in the decorating shop, had left the factory only a few minutes before the alarm was given. Much valuable stock was lost, but books and papers and also some valuable moulds and original patterns were saved. The cause of the outbreak is unknown.

Rubber

LIEUTENANT-COMMANDER Sir Hugh Dawson, R.N., and Mr. Henry B. Potter, directors of the British Goodrich Rubber Co., Ltd., have joined the board of the Stepney Tyre and Rubber Co., Ltd., which has taken over the Stepney tyre works in Blackhorse Road, Walthamstow. The works, which have been closed since the old company, Stepney Tyres, Ltd., went into liquidation last December, are now undergoing reconstruction, with a view to re-starting production of tyres and general rubber manufactures at an early date.

AMERICA is hailing a new synthetic rubber product. The Rev. Dr. Julius A. Nieuwland, a professor of chemistry at Notre Dame University, has discovered, after twenty-five years' research, the basic substance from which a material possessing all the properties of natural rubber can be made. Dr. Nieuwland has turned over his rights in the basic material to a large American corporation. This new product is said to possess qualities which in many respects are superior to those possessed by the crude article, and it is claimed that it is particularly suitable for the coating of cloth, and that it will stand heat and wear much better than natural rubber. The product is obtained from acetylene gas, of which almost unlimited quantities can be made.

Beet Sugar

UNDER the compulsory liquidation of Sugar Beet and Crop Driers, Ltd., the Official Receiver, who is also acting as liquidator, has issued his report, together with a summary of the statement of affairs, which shows an estimated surplus in assets of £300,292. Mr. H. P. Naunton, assistant official receiver, reports that, with the object of demonstrating the practicability of the company's process, a factory at Eynsham was purchased for £8,000 from the Ministry of Agriculture. Early in 1928, Lord St. John of Bletso (then a director) formed the West of England Beet Sugar Co., Ltd., purchased a factory at Taunton for £6,000, and contracted for the purchase of 25,000 tons of beet. It is stated that Lord St. John of Bletso failed to find the necessary capital, and, in view of his connection with the company, the factory at Taunton and the contracts were transferred to the company. The company appears to have existed on borrowed money almost from its inception, and security was given in the shape of debentures for about £220,000. In December, 1930, Mr. Stewart Cole was appointed receiver on behalf of the bondholders. The chief item of assets is a claim to £700,000 against the Ministry of Agriculture and University of Oxford. It is not possible for the Official Receiver to estimate what sum, if any, may be recovered in respect of that claim, which is being made by the receiver for the debenture-holders. The failure of the company is attributed to the failure of the extraction process, lack of capital at the inception of the company, overtrading and bad management.

Chemical Notes from Overseas

Kauri Gum Research in New Zealand

THE Department of Scientific and Industrial Research, which has been carrying on experiments at the request of the Kauri Gum Control Board, reports that tests in connection with a process for the extraction from kauri gum chips of a material suitable for use in nitro-cellulose lacquers have shown good results, and, subject to finance being available, the work will be continued.

Russian Glue Factory Project

THE Russian United Leather Substitutes Industry has begun the construction of a plant for the production of dry glue from fish by-products for use in the shoe industry. It is to be built on the Kola Peninsular, near Murmansk, and will be the first plant of its kind in the country. The plant is scheduled to begin operations during the second quarter of 1932.

Chemical Trade in Brazil

VARIOUS items of heavy chemicals are enjoying a better demand than in the preceding two months. For instance, there is evidence of a better movement in caustic soda, rosin, and borax. British manufacturers, as a result of the slump in sterling, are reported to be making a strong bid for business in this field obtaining some sizeable orders for certain items of heavy chemicals.

Norwegian Nitrogen Developments

NORSK Hydro has decided to discontinue the manufacture of calcium nitrate at its Heroya plant, devoting its resources to the production of nitrate of soda which, at the beginning, was merely a by-product. The activities of Norsk Hydro have had to be curtailed recently, and 600 workers have been released, although 3,000 or more still remain at work at the various plants.

New German Red Lead

A NEW form of very fine grain red lead has been placed on the market in Germany by the Th. Goldschmidt A.G. of Essen, under the trade name of "Tego." This product is reported to possess the valuable property of not settling hard in an oil paint, and when mixed with a linseed oil varnish and a binder, without other ingredients, the paint may be kept for a long time. The producers claim that the high dispersion of the product promotes formation of lead soaps to a greater extent than is the case with the ordinary red lead of commerce, and that this soap forming property imparts to red lead its value as a rust-preventive.

Chromium Interests in South Africa

THE cost of the chief chromium interests in the Transvaal, owned by the Chrome Corporation of South Africa (Ltd.), recently sold to the African Chrome Mines (Ltd.), was reported to have been £12,000 sterling. The African Chrome Mines (Ltd.), with its subsidiaries, is generally referred to as the "Chrome Trust" and is said to control roughly 85 per cent. of the world's output. Principal centres of operation are in Southern Rhodesia, India, and New Caledonia. The Transvaal firm, deemed one of the Union's most promising base metal concerns, produced in 1929, according to official statistics, between 60,000 and 70,000 tons of chrome ore.

A New Acid-Proof Porcelain

INDUSTRIES utilising hydrofluoric acid are normally compelled to keep this product in receptacles made of lead or some special materials, such as vulcanite, which are not attacked by the acid. According to the March issue of "Ind. Chemique," however, a new type of porcelain which answers this purpose, for laboratory and factory use, has now been produced. It is made by mixing natural crystallised calcium fluoride (fluorspar) with chemically precipitated calcium fluoride. The precipitated fluoride is washed and mixed with the pulverised natural product to form a paste which is dried at 100° C., after moulding. The receptacles are then fired at 1,250° C., out of contact with the air. From the point of view of mechanical and physical properties, this new porcelain is claimed to be equal to the best porcelain, and to withstand the action of hydrofluoric acid at all temperatures.

Casale Synthetic Ammonia Plants

AT the close of 1931 there were operating throughout the world 28 Casale ammonia plants with a total daily capacity 72 tons. The Casale company is now directing its attention to perfecting the process with a view to further reducing production costs.

Artemisia for Santonin Production

IT is reported that Kashmirian artemisia flowers are being shipped from British India to England for the production of santonin. Formerly, santonin was produced to a limited extent in India. An obstacle to a domestic industry is said to exist in a heavy royalty levied by the Government of Kashmir on all artemisia gathered.

Russian Potash Developments

IT is reported that a special commission was appointed recently by the Russian Foreign Trade Commissariat to investigate the purchase of equipment needs for development of newly discovered potash deposits in Central Asia. The Commission plans to visit Germany for the purpose of negotiating with several German manufacturers of equipment.

Yugoslavia Butyl Acetate Production

YUGOSLAV consumption of butyl acetate amounts to about 10,000 kilos annually. Three factories manufacture butyl acetate from imported butyl alcohol and, it is believed, supply a considerable share of the demand from domestic lacquer manufacturers. No import figures are available at present to show incoming shipments of butyl alcohol and butyl acetate.

Acid Plant in Shanghai

ONE acid plant is operating in Shanghai, its output capacity being three tons sulphuric acid daily and 100 tons each hydrochloric and nitric acid annually at present. Construction of a second plant of 15 tons sulphuric acid daily scheduled for completion this year, has been temporarily suspended. Plans for this plant also call for installations for producing hydrochloric and nitric acids after the sulphuric unit is operating. According to trade estimates the Yangtze Valley sulphuric acid consumption is about 18 tons per day.

Tungsten to be Produced in Nova Scotia

FOR some time past a company known as Indian Path Mines, Ltd., has been engaged on the development of a tungsten deposit located near Riverport in Lunenberg County, Nova Scotia, this having been worked as early as 1868 for gold. The company is now stated to have decided on the installation of a concentrating mill to treat scheelite (tungsten ore). This mineral occurs in various localities in Nova Scotia and shipments of small quantities of the ore were made in the years 1910 to 1913 and again in 1917 and 1918. The largest quantity was in 1918 when production amounted to 120 tons.

German Utilisation of Napthalene

THE German coal distillation industry has a capacity for the production of 80,000 metric tons of naphthalene for which there is no outlet. Some of the following uses are under consideration: (1) Hydrogenation to lighter hydrocarbons producing "dekalin" and "tetralin" to be used as solvents; (2)catalytic production of phthalic acid for dye intermediates; and (3) catalytic production of benzol with recovery of carbon dioxide and hydrogen. The present German output of "tetralin" and "dekalin" is estimated at 3,000 and 600 tons respectively.

Soya Bean Oil Developments in Manchuria

THE South Manchurian Railway, which is under Japanese control, is looking for capital to assist it in exploiting the Manchurian soya bean industry. Oil will be extracted from the beans, according to tentative plans of the railway company, by the use of alcohol instead of benzine, and the cake produced in the course of extraction will be used for making yeast and feed for poultry. The company is said to have a patent on the new method of extraction. During January, shipments of beans from Vladivostok and Dairen totalled 174,000 metric tons, as compared with 233,000 metric tons sent out during the same period last year.

New Uses for Rubber

Grocers' Association's Technical Research

ACCORDING to the Bulletin of the Rubber Growers' Association, research work is being carried out and grouped under the following headings: (1.) The use of latex or rubber dispersions as a constituent of the sizes used for calico printing, dyeing and stiffening, particularly as regards retention of stiffening ingredients and fillers. (2.) Incorporation of rubber in oil paints and corresponding investigation with rubber latex and water paints, distempers, etc. This investigation will be linked up with fundamental research into latex and the co-operation of the Rubber Research Institute of Malaya has been invited. (3.) Deodorisation of vulcanised rubber. (4.) Rubber as a jointing material for water and gas mains. (5.) Oil and petrol resistant rubber. (6.) Rubber in linoleum.

Gas and Oil Competition

National Gas Council's Attitude

MR. S. S. OGILVIE, joint manager of the National Gas Council, gave evidence on May 6 before a Joint Committee of both Houses of Parliament, which is considering the Gas Undertakings (Power of Investments) Bill. He said that the National Gas Council was very concerned with the competition which had been set up in recent years by oil. Oil companies had brought to a high state of perfection oil-burning appliances. Competition was very intense, and they were endeavouring in all large heating installations to oust either coke or gas.

The National Gas Council's competition had previously been with electricity, but it had been controlled to a certain extent. Oil was absolutely free. There was no obligation to supply anyone with oil. The oil companies picked and chose their customers and made such contracts as they thought fit. The point was whether this country was going to be a coal country or an oil country. He submitted that the last trench in which coal could meet oil was in the gas industry. It was only by the scientific treatment of coal that they could meet the attacks of oil.

At present gas undertakings could not become financially interested in companies which developed means of using gas or electricity. The oil companies could interest themselves in companies manufacturing appliances for using their product, and that was what the present Bill proposed to do for the gas industry.

Cement Developments at Billingham

Discovery of an Extensive White Rock Seam

IMPORTANT developments are anticipated at Billingham in consequence of the discovery of an extensive white cement rock seam beneath the works of Imperial Chemical Industries, Ltd. Experts believe that eventually the discovery will give employment to a large number of men. According to a special "North Mail" correspondent, a geological survey recently conducted has revealed that this mineral covers an area of nine square miles, and the seam in some places is 250 ft. in thickness. It is calculated that between two and three thousand million tons of this rock is contained within the area and that it will last for hundreds of years.

White cement rock (anhydrous calcium sulphate) is quarried, ground into a fine powder, and with the aid of nitrogen extracted from the atmosphere is made into plaster and building blocks. A large works is in course of erection to exploit the discovery. Already world patents have been taken out so that the industrial advantages will accrue to this country.

The initial work has been undertaken by Major V. Lefebure, of Darlington. He experimented with the white cement rock and realised its possibilities. What had hitherto been a waste product was converted into a material of manifold uses. The research laboratories of Imperial Chemical Industries, Ltd., were used, and the result is now a product for making all kinds of building materials such as cements, plasters, building blocks and decorative finishes.

White cement rock, when treated by the special process at Billingham, can be tooled, sawn and screwed like wood.

Publications Received

The Editor welcomes copies of new brochures and leaflets describing plant, equipment and products of interest to chemical manufacturers and the chemical using trades.

UNDER THE TITLE "The Ten Seconds Test," the British Hanovia Quartz Lamp Co., Ltd., of Slough, has issued a leaflet describing its new all-British analytical quartz lamp. Some of its practical applications are the differentiation between foods and other products, the detection of impurities, admixtures, etc., in chemicals and drugs, the identification of materials by their characteristic fluorescence, the grading of raw materials for purity by fluorescent comparison against standard samples, the detection of substitution, adulteration, fraud, etc., the revelation of inequalities of dyeing in textiles, ascertainment of process, dressing and finish and the analysis of solutions, extracts and mixtures. Legally, the onus lies on the buyer of any commodity to ascertain that it is genuine. The commodity may be food, raw material, finished products, collectors' pieces; the question of genuineness always arises. Again, money is exchanged for cheques and other paper securities, where safeguarding against fraud is necessary. A great number of commodities can be tested instantaneously with the analytic quartz lamp. This lamp develops a powerful beam of invisible ultra-violet rays. These rays have the peculiar property of causing many substances to fluoresce in striking colours. The colour in each instance is characteristic of the composition; an imitation or substitute will not reproduce the same fluorescent colour.

* * *

WE HAVE RECEIVED a copy of the first issue of "Sands, Clay and Minerals," a new quarterly magazine published by Algernon Lewin Curtis, of Westmoor Laboratories, Chatteris, for those interested in economic minerals. The magazine has come into being as a result of the interest taken in Mr. Curtis's catalogues. "Sands, Clays and Minerals" has a triple programme. First, it seeks to help British trade by promoting closer co-operation between the various industries; secondly, it aims at giving practical and reliable knowledge on sands, clays, etc., to manufacturers and other business men into whose industries these materials enter, and lastly, it aims at interesting all those who are in any way concerned with the minerals which the earth's crust provides.

* * *

ECONOMICAL SPRAYING of water for shower bath service is obtained by means of the "Minispray" shower, which is the subject of a leaflet issued by Gummers, Ltd., of Effingham Valve Works, Rotherham. With the "Minispray" shower, the water is concentrated in the form of fine spray. By this method, there is not only an economy in the volume of water consumed, with a consequent saving of fuel, but elimination of trouble experienced with other types of shower rose. The ordinary shower rose with perforated plates, through long usage passes more water than when new, as the hole gradually become larger, and very often, due to the pricking out of dirt or sediment, the holes are actually materially increased, with a consequent increase in the amount of water passing the shower. By concentrating the water leaving the shower in a more scientific manner, a more comfortable shower bath is obtained, with much less water and much less mess. For institution work and bath houses, the saving in fuel per annum, through obtaining maximum results from the hot water available, is considerable.

* * *

DIAL THERMOMETERS described in a folder of the Cambridge Instrument Co., Ltd., 45 Grosvenor Place, London, S.W.1, are claimed to serve their purpose more effectively than glass thermometers. By adopting standard patterns and ranges this firm have reduced the cost of manufacture and are now able to offer robust, accurate dial instruments at a price which compares favourably with that of high-grade glass thermometers. The bulb of the instrument, which is exposed to the temperature to be measured, is connected directly or by a length of tubing to a Bourdon gauge tube, the system being filled with a volatile liquid. Changes in the bulb temperature cause changes in the vapour pressure of the liquid, and the consequent movements of the Bourdon tube are communicated to a pointer moving over a calibrated scale.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

The following notes on the chemical market conditions in Great Britain are based on direct information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market by Chas. Tennant and Co., Ltd

THE demand for chemicals generally has been better during the current week, with prices on the whole steady. The market for coal tar products remains firm, but business is quiet and prices are unchanged. There are no price changes this week in intermediates and dyes. Sales of most lines of heavy chemicals on the Manchester market during the past week have been on a restricted scale and the bulk of transactions relate to small lots for early delivery. The movement of materials into consumption in the textile dyeing and finishing industries in the district is hardly so good as it has been during recent months and at the moment prospects of any marked improvement in the position in this respect are not very good. From now on until after Whitsuntide conditions are expected to be very dull. Meanwhile, steadiness is still the general experience with regard to prices, although here and there slight shadings have occurred since last week. In the Scottish market, little or no change has to be reported. There has, however, been a slight increase in export inquiries.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £37 5s. to £39 5s.; pure 80% £38 5s. to £40 5s.; tech., 40%, £19 15s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. SCOTLAND: Glacial 98/100%, £48 to £50; pure 80%, £38 5s.; tech. 80%, £37 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in one-ton lots upwards.

ACID, CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID, CITRIC.—1s. 1d. per lb. LONDON: 1s. 1d., less 5%. MANCHESTER: 1s. 1d. to 1s. 1½d.

ACID, CRESYLIC.—97/99%, 1s. 7d. to 1s. 9d. per gal.; 99/100%, 1s. 10d. to 2s.

ACID FORMIC.—LONDON: £50 per ton. *£52.

ACID, HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech.. 50% by vol., £23 10s. per ton; 50% by weight, £27 10s.; pale tech., 50% by vol., £27; 50% by weight, £32; 80% by weight, £52; edible, 50% by vol., £40. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £20 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 per ton in casks, £48 10s. in kegs. *£50. SCOTLAND: 98/100%, £50 to £53 ex store. MANCHESTER: £2 7s. 6d. per cwt., ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations: 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. 0¾d. per lb. SCOTLAND: B.P. crystals, 1s. 1¾d. to 1s. 2d. less 5% carriage paid. MANCHESTER: 1s. 0¾d.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON: £8 5s. to £9 10s. per ton according to quality and quantity. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb. d/d, according to quantity.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £36 per ton; powdered, £38, in 5-cwt. casks d/d U.K. stations or f.o.b. U.K. ports.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £19 to £20. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton, carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

ANTIMONY OXIDE.—SCOTLAND: Spot £27 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 4d. to 1s. 6d. per lb. according to quality.

ARSENIC.—LONDON: £24 10s. c.i.f. main U.K. ports for imported material; Cornish nominal, £26 10s. f.o.r. mines. SCOTLAND: White powdered £27 ex wharf; spot, £27 10s. ex store. MANCHESTER: White powdered Cornish, £26 10s. at mines.

ARSENIC SULPHIDE.—Yellow 1s. 6d. to 1s. 8d. per lb.

BARIUM CHLORIDE.—£11 to £11 10s. per ton.

BISULPHIDE OF LIME.—£7 10s. per ton f.o.r. London, packages free.

BLEACHING POWDER.—Spot 35/37% £7 10s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5/6 cwt. casks.

BORAX, COMMERCIAL.—Granulated £15 10s. per ton, powder £17, packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—3s. 6d. to 3s. 9d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot £5 5s. to £5 15s. per ton d/d station in drums. SCOTLAND: £5 5s. to £5 15s., according to quantity and point of delivery.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—4½d. to 5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £55 per ton, drums extra.

CHROMIUM OXIDE.—10d. to 10½d. per lb. according to quantity d/d U.K. Green 1s. 2d. per lb.

CHROMETAN.—Crystals 3¾d. per lb. Liquor £10 per ton d/d.

COPPERAS GREEN.—SCOTLAND: £3 15s. per ton, f.o.r., or ex works.

CREAM OF TARTAR.—LONDON: £5 2s. 6d. to £5 3s. 6d. per cwt.

FORMALDEHYDE.—LONDON: £28 to £28 10s. per ton. *£30. SCOTLAND: 40%, £28 10s. ex store.

HYDROGEN PEROXIDE.—LONDON: *100 vols. 10d. per lb.

LAMPBLACK.—£46 to £50 per ton.

LEAD ACETATE.—LONDON: White, £40 to £42 per ton. Brown £1 per ton less. *£40 and £30 respectively ex wharf London. SCOTLAND: White Crystals £42 to £44 c.i.f. U.K. ports. Brown £1 per ton less. MANCHESTER: White, £37, Brown, £36.

LEAD, NITRATE.—£28 10s. to £29 per ton.

LEAD, RED.—SCOTLAND: £28 10s. per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £40 per ton carriage paid.

LITHOPONE.—30%, £20 to £22 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYL SALICYLATE.—1s. 4½d. to 1s. 6½d. per lb. quantities. SCOTLAND: Industrial 64 O.P., 1s. 8d. to 2s. 3d.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 8d. to 2s. 3d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

NICKEL SULPHATE.—£38 per ton d/d.

PHENOL.—LONDON: *5½d. to 6½d. per lb.

POTASH CAUSTIC.—£30 to £33 per ton. LONDON and MANCHESTER: £42.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¾d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports with allowance for contracts. MANCHESTER: 5d.

POTASSIUM CARBONATE.—SCOTLAND: 96/98% spot £28 per ton ex store. LONDON: £31 10s. to £32. MANCHESTER: £31 to £32.

POTASSIUM CHLORATE.—3¾d. per lb. export London in 1-cwt. kegs. LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100% powder, £34. MANCHESTER: £36.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £28 per ton c.i.f U.K. ports. Spot £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: B.P. crystals, 8½d. MANCHESTER: Commercial, 8½d.; B.P., 8¾d.

POTASSIUM PRUSSIATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: Yellow spot material, 8½d. ex store. MANCHESTER: Yellow, 8½d.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d in barrels.

SODA ASH.—58% spot, £6 per ton f.o.r. in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot £14 10s. per ton d/d station. SCOTLAND: Powdered 98/99% £17 10s. in drums, £18 15s. in casks. Solid 76/77% £14 10s. in drums. 70/72% £14 12s. 6d. carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £12 15s. to £14 contracts.

SODA CRYSTALS.—Spot £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

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* Prices quoted by other manufacturers.

SODIUM ACETATE.—£21 to £22 per ton.

SODIUM BICARBONATE.—Refined spot £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous 5d. per lb. LONDON: 4d. per lb. with discounts for quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. less 1 to 3½% contracts, 4d. spot lots.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—2¾d. per lb. LONDON: £29 per ton. *£32 10s. MANCHESTER: £29.

SODIUM CHROMATE.—3⅝d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals £15 ex station 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.

SODIUM NITRITE.—Spot £19 to £22 per ton d/d station in drums.

SODIUM PERBORATE.—LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 to £15 per ton f.o.r. London casks free. LONDON: Dibasic, £13 per ton. MANCHESTER: £13 10s. to £14.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 6d.

SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground Spot £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d.

SODIUM SULPHIDE.—Solid 60/62% Spot £10 15s. per ton d/d in drums. Crystals Spot £7 15s. per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11 5s.; commercial, £8.

SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot £9 10s. d/d station in bags.

SULPHATE OF COPPER.—MANCHESTER: £18 per ton f.o.b.

SULPHUR.—£12 5s. to £15 15s. per ton. SCOTLAND: Flowers, £12 10s.; roll, £12 10s.; rock, £9. Ground American, £12 ex store.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VANILLIN.—Clove oil, 16s. to 18s. per lb.; Guaiacol, 1s. 9d. per lb. less.

VERMILION.—Pale or deep, 6s. 4d. per lb.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON and SCOTLAND: £12 per ton.

ZINC SULPHIDE.—1s. to 1s. 2d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, TARTARIC.—1s. 1d. per lb.

ATROPINE.—Alkaloid, 11s. to 11s. 6d. per oz.; sulphate, 7s. 6d. to 8s. 3d.

CAFFEINE.—Pure, 5s. 9d. per lb.; citras, 4s. 4d.

MENTHOL, A.B.R. RECRYST. B.P.—15s. 6d. per lb.

MERCURY OXIDE.—Green, 13s. 5d. per lb.; red, 15s. 4d.; yellow, 14s. 11d.

MERCURY.—Benzoate, 8s. 3d. per lb.; cyanide, 12s. 7d. to 13s. 1d.; oleate, 10%, 2s. 9d. to 3s.

POTASS. BITARTRATE (CREAM OF TARTAR).—99/100%, £5 4s. per cwt.

STRYCHNINE.—Alkaloid, pure crystal, 2s. 8d. per oz.; sulphate, 2s. 4d.

Perfumery Chemicals

ACETOPHENONE.—5s. 6d. per lb.

ANETHOL, 21/22° C.—5s. 3d. per lb.

BENZYL ACETATE (CHLORINE FREE).—1s. 9d. per lb.

BENZYL ALCOHOL (CHLORINE FREE).—1s. 9d. per lb.

BENZYL BENZOATE.—2s. 1d. per lb.

ETHYL PHTHALATE.—2s. 6d. per lb.

GERANIOL.—5s. to 10s. per lb.

ISO EUGENOL.—9s. per lb.

SAFROL.—1s. 8d. per lb.

Essential Oils

ALMOND, FOREIGN, S.P.A.—10s. 9d. per lb.

CAMPHOR, BROWN.—80s. per cwt.

CASSIA, 80/85%.—5s. per lb.

CITRONELLA, JAVA.—2s. 10d. per lb.

CITRONELLA, CEYLON.—2s. 3d. per lb.

LAVENDER, MONT BLANC, 38/40%.—11s. 3d. per lb.

ORANGE, SWEET.—9s. per lb.

PALMA ROSA.—10s. per lb.

Coal Tar Products

ACID, CARBOLIC (CRYSTALS).—5½d. to 6¾d. per lb. Crude, 60's 1s. 5½d. to 1s. 6¼d. per gal. SCOTLAND: Sixties, 1s. 7d. to 1s. 8d.

ACID, CRESYLIC.—99/100, 1s. 7d. per gal.; B.P., 2s. to 2s. 2d.; Refined, 1s. 9d. to 1s. 11d.; Pale, 98%, 1s. 6d. to 1s. 7d.; Dark, 1s. 4d. to 1s. 4½d. LONDON: 98/100%, 1s. 6d. Dark 95/97%, 1s. 4d. SCOTLAND: Pale 99/100%, 1s. 3½d. to 1s. 4½d.; 97/99%, 1s. 1½d. to 1s. 2½d.; dark 97/99%, 1s. 0½d. to 1s. 1½d.; high boiling acid, 2s. 6d. to 3s.

BENZOL.—At works, crude 7d. to 7½d. per gal. Standard motor, 1s. 2d. to 1s. 3d.; 90%, 1s. 3d. to 1s. 4d. Pure, 1s. 6d. to 1s. 7d. LONDON: Motor, 1s. 5½d. SCOTLAND: Motor, 1s. 3½d. to 1s. 4½d.; 90%, 1s. 9½d. to 1s. 10½d.

CREOSOTE.—Standard for export, 4¾d. to 5d. nett per gal. f.o.b. for Home, 3¾d. d/d. LONDON: 3d. to 3½d. f.o.r. North; 4d. to 4½d. London. MANCHESTER: 4d. to 5d. SCOTLAND: Specification oils, 3¾d. to 4¼d.; washed oil, 4d. to 4½d.; light, 4d. to 4½d.; heavy, 4¼d. to 5d.

NAPHTHA.—Solvent, 90/160, 1s. 4d. to 1s. 5d. per gal.; 95/160, 1s. 4½d.; 90/190, 11d. to 1s. 1d. LONDON: Solvent, 1s. 1½d. to 1s. 2d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160, 1s. 3d. to 1s. 3½d.; 90/190, 1s. 1d. to 1s. 2d.

NAPHTHALENE.—Purified crystals, £9 10s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 65s. to 70s.

PYRIDINE.—90/140, 3s. 9d. per gal.; 90/160, 4s. to 4s. 6d.; 90/180, 2s. to 2s. 6d. SCOTLAND: 90/160%, 4s. to 5s.; 90/220%, 3s. to 4s.

REFINED COAL TAR.—SCOTLAND: 5d. to 5½d. per gal.

TOLUOL.—90%, 2s. 2d. per gal.; Pure, 2s. 7d.

XYLOL.—1s. 9d. per gal.; Pure, 1s. 11d.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 per ton. Grey, £12. Liquor, 8d. to 9d. per gal. MANCHESTER: Brown, £7 5s.; grey, £11.

ACETIC ACID, TECHNICAL, 40%.—£16 15s. to £17 15s. per ton.

ACETONE.—£63 to £65 per ton.

AMYL ACETATE, TECHNICAL.—95s. to 100s. per cwt.

CHARCOAL.—£7 10s. to £11 per ton.

IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gal.

WOOD CREOSOTE.—1s. to 2s. 6d. per gal., unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gal. Solvent, 3s. 9d. to 4s. 9d. per gal.

WOOD TAR.—£2 10s. to £6 per ton.

BROWN SUGAR OF LEAD.—£32 per ton.

Latest Oil Prices

LONDON.—May 11.—LINSEED OIL was firmer. Spot (small quantities), £16; May, £13 7s. 6d.; May-Aug., £13 10s.; Sept.-Dec., £14 10s.; Jan.-April, £15 10s. per ton, naked. RAPE OIL was slow. Crude extracted, £28 10s.; technical refined, £30 10s. per ton, naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £10; refined common edible, £22; and deodorised, £24 per ton, naked, ex mill. TURPENTINE was steady. American, spot, 58s.; June, 57s. per cwt.

HULL.—LINSEED OIL.—Spot, £13 12s. 6d.; May at £13 2s. 6d.; June-Aug. at £13 7s. 6d.; Sept.-Dec., at £14 2s. 6d.; and Jan.-April at £15. COTTONSEED.—Egyptian crude, spot, £10; edible refined, spot, £20 10s.; technical, spot, £20 10s.; deodorised, £23 per ton, naked. PALM KERNEL OIL.—Crude, f.m.q. spot, £21 10s. per ton, naked. GROUNDNUT OIL.—Crushed-extracted, spot, £32 10s.; deodorised, £36 10s. per ton. RAPE OIL.—Crushed-extracted, spot, £28; refined £29 10s. SOYA OIL.—Crushed-extracted, spot, £19; deodorised, £22 per ton. COD OIL, 17s. per cwt. CASTOR OIL.—Pharmacy, spot, 42s. 6d.; first, 37s. 6d.; second, 32s. 6d. per cwt. TURPENTINE.—American, spot, 57s. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—There have been considerable offerings during the week and the price has receded to £4 10s. per ton f.o.b. U.K. port in single bags. The consuming season in Northern Europe is almost over, but some sellers appear still to be pressing supplies upon the market. *Home.*—A large number of manufacturers have been offering at about £6 per ton delivered in 6-ton lots to consumers' nearest station, and a sale has been reported at below this figure. As the consuming season is nearly over sales now are very small.

NITRATE OF SODA.—The price of the imported product continues at £9 per ton delivered in 6-ton lots. British material continues at £8 16s. per ton.

NITRO-CHALK.—Remains unchanged at £7 5s. per ton.

* Prices quoted by other manufacturers.

Inventions in the Chemical Industry

Specifications Accepted and Applications for Patents

THE following information is prepared from the Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given in "Specifications Accepted" are those under which the specifications are printed. Abridgments of "Complete Specifications open to Public Inspection" will not be published until they have been accepted or the applications have become void. The dates given are those claimed under the International Convention. The numbers in "Applications for Patents" are for reference in all correspondence up to the acceptance of the complete specifications. In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.

Specifications Accepted with Date of Application

RESIN COMPLEX, AND METHOD OF PRODUCING THE SAME. I. Rosenblum. Oct. 24, 1930. 371,850.

PROCESS FOR HYDROGENATING PHENOLS AND TAR ACIDS. M. A. Matthews and H. E. Newall. Nov. 24, 1930. 371,851.

DESTRUCTIVE HYDROGENATION OF CARBONACEOUS MATERIALS. J. Y. Johnson. (*I. G. Farbenindustrie.*) Jan. 21, 1931. 371,833.

MANUFACTURE AND PRODUCTION OF ACETYLENE AND CARBON BLACK. J. Y. Johnson (*I. G. Farbenindustrie*). Jan. 22, 1931. 371,916.

MANUFACTURE AND PRODUCTION OF ACETYLENE AND CARBON BLACK. J. Y. Johnson (*I. G. Farbenindustrie*). Jan. 22, 1931. 371,917.

MANUFACTURE OF VAT-DYESTUFF PREPARATIONS FOR TEXTILE PRINTING. A. Carpmael (*I. G. Farbenindustrie*). Jan. 24, 1931. 371,836.

MANUFACTURE AND PRODUCTION OF WETTING, CLEANSING, EMULSIFYING, AND THE LIKE AGENTS. J. Y. Johnson (*I. G. Farbenindustrie*). Jan. 26, 1931. 371,822.

MANUFACTURE OF A CARBAZOLE COMPOUND. A. Carpmael (*I.G. Farbenindustrie*). Jan. 26, 1931. 371,827.

DYESTUFF PREPARATIONS FOR COTTON PRINTING. A. Carpmael. (*I. G. Farbenindustrie*). Jan. 27, 1931. 371,848.

PROCESS OF PRODUCING HIGHER ALCOHOLS BY FERMENTATION. J. F. Loughlin. Jan. 31, 1930. 371,865.

AZO DYESTUFFS FOR LEATHER. Imperial Chemical Industries, Ltd., M. Mendoza, and J. Hannon. Jan. 28, 1931. 371,866.

RECOVERY OF SULPHUR DIOXIDE FROM GAS MIXTURES CONTAINING IT. J. S. Dunn and Imperial Chemical Industries, Ltd. Jan. 29, 1931. 371,888.

PROCESS FOR THE MANUFACTURE OF PRODUCTS FROM 7-IODO-8-HYDROXYQUINOLINE-5-SULPHONIC ACID OR SALTS THEREOF. Dr. F. Krollpfeiffer. Jan. 30, 1930. 371,894.

APPARATUS FOR EVAPORATING AND DISTILLING LIQUIDS. D. G. Jack. Feb. 21, 1930. 371,895.

MANUFACTURE OF ALIPHATIC ANHYDRIDES. British Celanese, Ltd., S. J. Green, and T. P. Dee. Jan. 31, 1931. 371,946.

MANUFACTURE OF ESTER-LIKE WETTING-AGENTS, FOAMING AGENTS, AND DISPERSING-AGENTS. I. G. Farbenindustrie. Feb. 25, 1930. 372,005.

MANUFACTURE OF ALDEHYDES AND INTERMEDIATE PRODUCTS. W. W. Groves (*I. G. Farbenindustrie*). Mar. 3, 1931. 372,013.

PROCESS FOR CHLORINATING ORGANIC COMPOUNDS. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Oct. 8, 1930. 372,028.

MANUFACTURE OF ARTIFICIAL MASSES. Soc. of Chemical Industry in Basle. July 9, 1930. 372,075.

MANUFACTURE OF ARTIFICIAL RESINS. Soc. of Chemical Industry in Basle. July 11, 1930. 372,076.

MANUFACTURE OF MIXED ESTERS OR ETHER-ESTERS OF POLYMERIC CARBOHYDRATES. I. G. Farbenindustrie. June 4, 1930. 372,122.

PROCESS FOR THE MANUFACTURE OF VAT DYESTUFFS OF THE ANTHRAQUINONE SERIES. I. G. Farbenindustrie. June 3, 1930. 372,123.

MANUFACTURE OF ANTIMONY COMPOUNDS. Chemische Fabrik Vorm. Sandoz. July 8, 1930. 372,143.

COMPLETE EXTRACTION OF ALL THE SUGAR AND SOLID MATTER FROM THE JUICE OF SUGAR-CANE, BEETROOTS, AND ALL PLANTS CONTAINING SUGAR. A. Meiro. Aug. 26, 1930. 372,147.

PROCESS AND APPARATUS FOR THE EXTRACTION OF IODINE FROM MINERAL WATERS AND OTHER IODINE-CONTAINING LIQUIDS. R. Pajetta and A. Maggioni. July 17, 1930. 372,157.

MANUFACTURE OF SULPHONATED CONDENSATION PRODUCTS. Compagnie Nationale de Matières Colorantes et Manufactures de Produits Chimiques du Nord Reunies Etablissements Kuhlmann. Aug. 1, 1930. 372,159.

EDELEANU PROCESS FOR THE PURIFICATION OF HYDROCARBONS. Edeleanu Ges. July 25, 1930. 372,173.

RECOVERY OF ARSENIC FROM ARSENIFEROUS METALLURGICAL INTERMEDIATE PRODUCTS AND BY-PRODUCTS. Norddeutsche Affinerie. Sept. 9, 1930. 372,189.

PROCESS FOR PRODUCING FAST-COLOUR RESERVES BY MEANS OF ESTER SALTS OF LEUCO VAT-DYESTUFFS WITHOUT STEAMING. Durand and Huguenin Akt.-Ges. Aug. 13, 1930. 372,190.

MANUFACTURE OF CONDENSATION PRODUCTS OF AMINO-SUBSTITUTED ARSENO-COMPOUNDS. I. G. Farbenindustrie. Sept. 20, 1930. 372,213.

PROCESS FOR PRODUCING FAST COLOUR RESERVES BY MEANS OF ESTER SALTS OF LEUCO VAT DYESTUFFS WITHOUT STEAMING. Durand and Huguenin Akt.-Ges. Oct. 10, 1930. 372,224.

PREPARATION OF STABLE SUPER-SATURATED CALCIUM GLUCONATE SOLUTIONS. Chemische Fabrik Vorm. Sandoz. Oct. 14, 1930. 372,225.

TREATMENT OF VEGETABLE LECITHIN. Hanseatische Muehlenwerke Akt.-Ges. Nov. 11, 1930. 372,232.

Complete Specifications open to Public Inspection

VESSELS FOR USE IN CARRYING OUT CHEMICAL PROCESSES UNDER HIGH PRESSURES AND TEMPERATURES. F. Krupp Akt.-Ges. Apr. 27, 1931. 5161/32.

PURIFICATION OF GASES DERIVED FROM ROASTING PROCESSES. I. G. Farbenindustrie. May 1, 1931. 6081/32.

STARCH-CONVERSION PRODUCTS, AND PROCESSES OF PREPARING THE SAME. American Diamalt Co. Apr. 30, 1931. 6536/32.

PROCESS FOR THE EXTRACTION OF DISSOLVED OR SUSPENDED LIQUIDS AND SPARINGLY-SOLUBLE ORGANIC LIQUIDS, IN PARTICULAR CONTAINED IN SMALL QUANTITIES, IN EFFLUENT WATER. Carbo-Norit-Union Perwaltungs-Ges. May 2, 1931. 10148/32.

PROCESS OF PRODUCING PERFECTLY HOMOGENEOUS SOLUTIONS OF DRYING-AGENTS. I. G. Farbenindustrie. May 2, 1931. 10476/32.

REFINING OF LIQUID HYDROCARBONS BY MEANS OF LIQUID SULPHUR DIOXIDE. Edeleanu Ges. May 2, 1931. 11101/32, 11102/32.

PRODUCTION OF CHOLINE COMPOUNDS. F. F. Korner. Apr. 29, 1931. 12285/32.

PARTIAL OXIDATION OF UNSATURATED HYDROCARBONS. E. I. Du Pont De Nemours & Co. Apr. 28, 1931. 12291/32.

MANUFACTURE OF AROMATIC COMPOUNDS. I. G. Farbenindustrie. Apr. 29, 1931. 12372/32.

PROCESS FOR THE PREPARATION OF CONDENSATION PRODUCTS OF THE ANTHRAQUINONE SERIES. Chemische Fabrik Vorm. Sandoz. Apr. 29, 1931. 12378/32.

PROCESS FOR THE MANUFACTURE OF STABLE BARBITURIC ACID COMPOUNDS. I. G. Farbenindustrie. Apr. 29, 1931. 12394/32.

Applications for Patents

MANUFACTURE OF COLOUR LAKES. J. Barker and Cornbrook Chemical Co., Ltd. May 3, 12686.

PRODUCING HYDROXIDES AND CARBONATES OF ALKALIES. M. Buchner. May 4. 12856.

MANUFACTURE OF ETHER DERIVATIVES OF CARBOHYDRATES. C. F. Burgess Laboratories, Inc. Aug. 14, '31. (United States, Aug. 14, '30). 12891.

DISTILLATION OF CARBONACEOUS MATERIALS. E. J. Byrne and F. A. Byrne. May 5, 13046.

MANUFACTURE OF ARYLISOTHIAZOLONES. A Carpmael (*I. G. Farbenindustrie.*) May 3. 12757.

MANUFACTURE OF CHLORINATED ARYLENETHIAZOLES. E. I. Du Pont de Nemours & Co., May 6. (United States, May 6, '31.) 13105.

MANUFACTURE OF ORGANIC SALTS OF BISMUTH, &C. G. B. Ellis (*Soc. des Usines Chimiques Rhône-Poulenc*). May 2, 12636.

MANUFACTURE OF FATTY ACIDS AND SOAPS THEREFROM. C. J. Greenstreet. May 5. 12084.

MANUFACTURE OF MIXED POLYMERISATION PRODUCTS. W. W. Groves (*I. G. Farbenindustrie*). May 7. 13264.

MANUFACTURE OF ARYLISOTHIAZOLONES. I. G. Farbenindustrie. May 3. 12757.

MANUFACTURE OF SOLID GREASES. J. Y. Johnson (*I. G. Farbenindustrie*). May 6. 13148.

MANUFACTURE OF SALTS OF AMINO-ACRIDINE COMPOUNDS. I. G. Farbenindustrie. May 4. (Germany, May 4, '31.) 12866.

MANUFACTURE OF VISCOSE. Imperial Chemical Industries, Ltd. May 3. 12788.

DEGREASING. Imperial Chemical Industries, Ltd., and J. Savage. May 6. 13157.

RECOVERY OF SULPHUR DIOXIDE FROM GAS MIXTURES. Imperial Chemical Industries, Ltd. and D. Tyrer. May 6. 13158.

CHEMICAL PROCESSES. F. D. Reynold. May 5. 12916.

PRODUCTION OF VITAMEN A. C. P. Snow. May 4, 12857.

PRODUCTION OF ETHYLENE OXIDE FOR PREPARATION OF ETHYLENE-GLYCOL. Soc. Française de Catalyse Généralisée. May 2. (France, Oct. 3, '31.) 12561.

PRODUCTION OF ETHYLENE OXIDE FOR PREPARATION OF ETHYLENE-GLYCOL, ETC. Soc. Française de Catalyse Généralisée. May 2. (France, Dec. 19, '31.) 12579.

SEPARATING LIGHT OILS FROM WASH OILS. C. Still. May 3. 12746.

APPARATUS FOR COOLING AND SEPARATING OUT MIXTURES OF DISTILLATES. C. Still. May 6. 13119.

A New British Industrial Policy

Effect of Taxation

THE report on British financial and monetary policy which the Federation of British Industries published at the end of last week is undoubtedly one of the most comprehensive reports it has published since the war. In it the conduct of British and American financial affairs over the ten years ended 1929 is critically reviewed, and far-reaching recommendation are made for the reform of British investment and monetary technique.

The effect of national taxation on the capital supply of industry, the repercussions on British development of reconstruction loans to Europe, and the need for a comprehensive Empire currency and investment policy are among the subjects covered. The report concludes with the outline of a new British development plan to include not only the Dominions and Colonies, but also certain other selected areas. This plan, it is believed, might ensure an early recovery of British trade, and provide the world with a way out of the present crisis.

A British Cosach Committee

Shareholders Interests

IN view of the position of the Chilean nitrate industry, a protective committee representing the British holders of securities of the Cosach Concern and its associated nitrate companies has been formed. The committee is representative not only of Cosach security holders but of the city of London itself.

Its members comprise: Hon. Alexander Baring (Baring Bros. and Co., Ltd.); Sir Bertram Hornsby (Anglo-South American Bank); Mr. A. A. Jamieson (Robert Fleming and Co., Ltd.); Mr. H. P. Lawson (W. Greenwell and Co.); Mr. A. Leibne (on behalf of British Insurance Association); Mr. L. A. Stride (Industrial and General Trust, Ltd.); Mr. Henry F. Tiarks (J. Henry Schroder and Co.) and Mr. A. H. Wynn (Mercantile Investment and General Trust Co., Ltd.). Mr. N. Campbell, of Helbert, Wagg and Co., Ltd., will act as independent chairman.

Mr. R. J. Stopford, of 41 Threadneedle Street, E.C., will act as secretary.

From Week to Week

IT IS ANNOUNCED that Thomas Hedley and Co. are to build a new soap plant at Manchester, larger than the firm's present works at Newcastle.

A REPORT OF THE EXPLOSION at Darlington Forge on May 2, which resulted in the death of one man and severe injuries to three others, reported in THE CHEMICAL AGE last week, is to be prepared by Professor Anderson, of Birmingham University, an expert on liquid oxygen plant.

SINCE GREAT BRITAIN went off the gold standard, eight firms, seven of which are of foreign origin, have decided to move their works to Welwyn, Hertfordshire. These include two Belgian match firms and a German concern manufacturing toothpaste, medical plasters, and face cream.

ELIZABETH BROCKMAN, a twelve years old schoolgirl, was injured in an accident in the chemical laboratory at Bridlington High School for Girls on May 5. The girls were experimenting by passing steam through heated magnesium when a cork was displaced and the girl was scalded in the face.

MR. WILLIAM THOMAS HOWROYD, of Meols Drive, Hoylake, a former director of the Calder and Mersey Extract Company, Ltd., Ditton, at one time one of the most prominent business men associated in this country with the manufacture of tanning extracts, left £48,858 (net personalty £43,450.)

THE IRISH FREE STATE DEPARTMENT OF INDUSTRY AND COMMERCE has established a new factory for the handling of carrageen moss at Blacksod Bay, County Galway. Some fifty girls are to be employed, and Mr. Patrick, Keane, P.C., Cortoon, Blacksod, is in charge of the supplies to the factory.

FIRE BROKE OUT on May 6 in the naphthalene department of the Blackley works of the British Dyestuffs Corporation, Manchester. There were no workman in the building at the time, but the flames were observed early and the works fire brigade was called out. An alarm was also sent to the Manchester Fire Brigade, but when they arrived the fire had been got under control.

MR. I. E. WEBER, a technical director of B. Laporte, Ltd., in a recent lecture to the Society of Dyers and Colourists, stated that not only was his company pioneers in the manufacture of 30 per cent. and 40 per cent. hydrogen peroxide from barium peroxide, producing a particularly stable hydrogen peroxide, but it had for some time been producing hydrogen peroxide in an electrolytic unit by a method which it had developed.

THE MEMBERS OF THE PHYSICAL SOCIETY, through the kindness of Professor H. L. Brose, have been invited to visit the physics department of the University of Nottingham on June 11. It has been arranged for the party to inspect the Council House before lunch. A meeting of the Society will be held at 2.30 p.m. at the College. During the afternoon it is proposed that ladies and friends inspect Players' factory and afterwards drive to Newstead Abbey. Tea will be served in the College Refectory at 4.45.

PROFESSOR P. SARGANT FLORENCE, of the Faculty of Commerce, Birmingham University, addressed a meeting under the auspices of the Business Research and Management Association of Great Britain at Anderton's Hotel, Fleet Street, London, on May 11, on "Education for Management." Professor Florence considers management to be the weak link in British industrial organisation, and in his address he examined somewhat critically the influence of the public school spirit and other conventional points of view upon the efficiency of British industrialists and their staffs.

IT IS REPORTED that the Société de Sulphurophosphate of Paris, operators of a fertiliser plant in France, will establish a factory at Plymouth, with a capacity of some 15,000 tons. The company has marketed sulphurophosphate in Western England for a number of years.

NEGOTIATIONS FOR THE FLOTATION of a company with a capital of £150,000 are in progress in connection with the development of a new patented process for the preparation of coal for marketing purposes. It is proposed to erect a new works at Darlington at an estimated cost of £20,000, which will provide work for 1,000 people.

SIR JOSEPH TURNER addressed a meeting of the Kidderminster Rotary Club last week on "The Development of Chemistry as Applied to the Needs of the Individual." After the address, the members of the Club visited the works of Tomkinsons, Ltd., where they were entertained by the firm.

IT IS LEARNED IN DUBLIN that the asbestos deposits at Avoca, County Wicklow, discovered some twelve months ago, have not yet been commercially worked, but under the new Mines and Minerals Act, passed recently by the Free State Dail, some action for their working in the near future is expected to be taken.

A GENERAL MEETING of the members of the Royal Institution was held on Monday, May 9, Sir Robert Robertson, treasurer and vice-president, being in the chair. Sir Joseph Thomson was re-elected Honorary Professor of Natural Philosophy, and Lord Rutherford of Nelson was re-elected Professor of Natural Philosophy. Mr. H. E. Cox was elected a member.

ERNEST ALFRED BRAY, aged 54, of Sheffield, lost his life on Monday in pushing one of his workmates out of a gas-filled chamber to safety in the armour plating department at the steelworks of Thomas Firth and John Brown, Ltd., a department which only resumed work the previous day after standing idle for nearly ten weeks. Three other men were gassed, and Bray died shortly after admission to the infirmary.

AWARDS OF THE GOLD MEDAL of the Institution of Mining and Metallurgy have been made by the council to Sir H. C. Harold Carpenter, F.R.S., in recognition of his eminent services in the advancement of metallurgical science and technology, and to Dr. Thomas A. Rickard for his services in the general advancement of mining engineering, with special reference to his contributions to technical and historical literature.

A SPECIAL COURSE OF EIGHT LECTURES on rubber chemistry will be given at Aston Technical College, Birmingham, on Mondays and Wednesdays, from 7.30 to 9.30 p.m., commencing May 23. The lecturer will be Mr. J. C. Hutton. Lectures and practical work will deal with properties of crude and vulcanised rubber; substances used in the manufacture of rubber articles; types; waterproof materials; vulcanite and ebonite. The fee for the course is 2s. 6d.

LONG SERVICE AWARDS have been presented by Sir Harry McGowan to the following members of the headquarters staff of Imperial Chemical Industries, Ltd., in respect of service up to December 31, 1931:—Gold medal: Messrs. J. Hornby (40 years' service), B. E. Johnson (40), A. Bailey (40). Gold watch: Miss B. Dexter (35 years' service), Messrs. J. H. Vine (35), A. A. Adams (35), G. P. Tomkinson (35). Silver watch and medal: Messrs. G. H. Escott (28 years' service), H. E. C. Selwyn (25), G. J. Muir (25), C. Wright (25), W. H. Hodge (25), R. B. Brown (25), A. G. Major (25), L. J. A. Greenwood (25), H. Carrington (25), D. W. G. Port (25), S. W. Wood (25), J. Christie (Steatite) (27), T. Forster (Silvertown Sales Office) (25).

IN THE INVESTIGATIONS now being carried out in the Irish Free State for the development of the livestock industry, research will be made into the financial possibilities of chemical by-products from the cattle slaughtered. It is pointed out that apart from soap, glues and fertilisers, insulin and a large range of other pharmaceutical products can be obtained from the same source. Some time ago investigations were made regarding the establishment of a casein factory for the utilisation of surplus milk, but these have not yet come to fruition.

IT WAS ANNOUNCED in New York on April 29 that the interest due on May 1 on the Anglo-Chilean Consolidated Nitrate Corporation's $14,125,000 20-year 7 per cent. sinking fund debenture bonds, maturing in 1945, would not be paid. The Anglo-Chilean Corporation forms one of the largest units of the Chilean nitrate combine, Cosach, the directors of which have been negotiating in New York for a month for the reorganisation of the combine. The announcement says the marked reduction in consumption of nitrate throughout the world, due to the present agricultural and economic crisis, "necessitates the readjustment of Cosach upon a basis making it possible for the merger to continue in face of new world conditions." The reference to the need for readjustment is taken to mean that Cosach has convinced the bankers to this end, although details are not revealed and the negotiations are continuing. There is also £3,150,000 Anglo-Chilean 7 per cent. first mortgage debenture stock. Interest has been paid to date and the next payment falls due on July 1.

THE DRUG SECTION of Boots' large factory at Beeston, Notts., will commence operations next Tuesday. Already the soap section is housed in the factory and eventually the whole of the pharmaceutical side will be transferred to Beeston.

SIR DAVID MILNE-WATSON, presiding at the annual meeting of the National Gas Council on May 10, said the country must be warned seriously against going over to oil as the fuel of the future. We lived largely on imported foods, and if we were to live on imported oil, Sir David considered that the country would be simply doomed, because not only would the coal industry suffer, but the railways also. The best way to counter oil was with gas. That had been said by no less an authority than Sir John Cadman. Sir David was re-elected president of the Council.

ADMIRAL OF THE FLEET Sir Roger Keyes spoke on "Sea Power" at the fifty-third Individualist Luncheon at the Hotel Victoria on Wednesday. A recent "Times" correspondent, he said, had argued that the crux of disarmament was the problem of aircraft and chemical warfare, but from his own experience he denied that surface navies were obsolete weapons. As an Individualist, he ventured to give his opinion, based on his experience with both air and submarine arms at Dunkirk, that the newly invented weapons had their limitations, and that so long as Great Britain remained an island its sea power was of paramount importance. A vote of thanks to Sir Roger was proposed by Sir Arthur Shirley Benn, seconded by Sir Archibald Hurd, and supported by Sir Ernest Benn.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]

ATLAS ARTIFICIAL SILK PROCESSES LTD., Littleborough. (M., 14/5/32.) Registered March 17, £100,000 debenture stock secured by Trust Deed dated March 3, 1932, with power to increase up to £200,000; charged on properties at Littleborough, etc., also general charge, subject, etc.

BITMAC, LTD., Scunthorpe, tar distillers. (M., 14/5/32.) Registered April 28. £1,500 debentures, part of £5,000; general charge. *£2,000. April 1, 1931.

BRITANNIA LEAD CO., LTD., London, E.C. (M., 14/5/32.) Registered April 29, debenture securing $1,000,000 (U.S.) (not ex.) from time to time owing by the company or Mount Isa Mines, Ltd., to American Smelting and Refining Co., New York; general charge. *——. January 4, 1932.

KENFORD, LTD., London, E.C., chemical manufacturers. (M., 14/5/32.) Registered April 13, debenture and a charge collateral thereto securing to Alvah Towers Co., Ltd., Dashwood-ho., E.C., £6,000 and further advances not ex. therewith £14,000 and all moneys not ex. £10,000 which they may be called upon to pay under a certain guarantee; general charge and charged on land and Imperial Works, Balmoral Road, Watford. *£7,000. May 29, 1931.

ROCHE (Dr. T. F.), LTD., London, S.W., chemical manufacturers, etc. (M., 14/5/32.) Registered April 28, £500 debentures to Mrs. F. E. Roche, 25 South Side, Clapham Common; general charge.

TRAGASOL PRODUCTS, LTD., Hooton. (M., 14/5/32.) Registered April 27, £12,500 (not ex.) 1st debenture to Martins Bank, Ltd., general charge (other than company's factory, etc., in Cyprus) ranking in priority to £10,000 existing debentures. *£7,600. November 27, 1931.

Companies Winding-up Voluntarily

CLEAN COAL CO., LTD. (C.W.U.V., 14/5/32.) By reason of its liabilities. May 4. Mr. Cecil Rhodes Dormer, a partner in the firm of Cooper Brothers and Co., Chartered Accountants, E.C.4, appointed liquidator. Creditors' claims to C. R. Dormer, 14 George Street, Mansion House, London, E.C.4, by June 8.

LONDON CASEIN WORKS, LTD. (C.W.U.V., 14/5/32.) Creditors' claims to Frederick Seymour Salaman, of 1 and 2, Bucklersbury, London, E.C.4, the liquidator of the company, by June 6.

Notice of Intended Dividend

WILKINSON, GEORGE HAROLD, "The Hollies," Haygate Road, Wellington, Salop, carrying on business at The Wrekin Chemical Works, Stirchley, Salop, under the name or firm of "The Wrekin Chemical Co.," chemical manufacturers. Last day for receiving proofs, May 20, 1932. Trustee, Frederick Ernest Bendall, Midland Chambers, Warwick Passage, Corporation Street, Birmingham.

Chemical Trade Inquiries

Abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

CYPRUS.—A Famagusta agent wishes to represent United Kingdom manufacturers of mineral oils, linseed oils, paints, coal tar, and coal pitch tar on a commission, purchasing or consignment basis. (Ref. No. 831.)

BRITISH INDIA.—A Parsee firm of manufacturers' representatives in Bombay is desirous of securing commission agencies for medicinal oils, drugs and chemicals, and glycerine for the Bombay Presidency. (Repetition of Ref. 490.) (Ref. No. 832.)

UNITED STATES.—A firm in St. Paul, Minnesota, is desirous of establishing connections with United Kingdom manufacturers of drugs, pharmaceutical products and druggists' sundries desirous of extending the sale of their products in the United States. (Ref. No. 857.)

New Companies Registered

AGRICULTURAL AND PUBLIC CONTRACTORS, LTD., Letacre, Nightingale Lane, Furze Platt, Maidenhead.—Registered May 7. Nominal capital £500 in £1 shares. Chemical and fertiliser manufacturers, dealers and merchants, bone degreasers, analytical chemists, druggists, etc. The directors are N. H. Cooper and E. H. Sims.

ASHBROOKS (1932), LTD., Wood Mill, Woodley, Ches. Registered April 9. Nominal capital £5,000 in £1 shares. To acquire the business of chemical colour and dye manufacturers carried on by Ashbrooks (1920) Ltd., at Wood Mill, Woodley, Ches. Directors: F. Fletcher and Mrs. G. Fletcher.

BRITISH BENZINE PRODUCTS, LTD., 171 Queen Victoria Street, London, E.C. Registered April 12. Nominal capital, £1,250. Chemists druggists, drysalters, oil and colour men, etc. Directors: A. H. Johnson, W. F. Lightfoot, J. B. W. France and G. Reik.

CELLUSAN COMPANY, LTD., 227 and 229 Essex Road, London, N.1. Registered April 29. Nominal capital, £100 in £1 shares. Objects: To acquire the trade marks "Cellusan" and "Viola," and to carry on the business of manufacturing and analytical chemists, manufacturers of surgical and sanitary specialities, etc. Directors: R. B. Carnegie, D. M. Carnegie.

FERBRITE, LTD. Registered April 16. Nominal capital £1,100 in £1 shares. To acquire, turn to account and trade with processes and inventions relating to metallurgical processes, etc. A subscriber: Rose Roth, 39 The Vale, Golders Green, London, N.W.11.

Forthcoming Events

May 18.—Electroplaters' and Depositors' Technical Society. "The Adhesion of Electrodeposited Nickel to Brass." A. W. Hothersall. 7.45 p.m. Northampton Polytechnic Institute, London.

May 19.—Chemical Society. Discussion on "Some Aspects of Asymmetric Synthesis." Professor A. McKenzie. 8 p.m. Burlington House, Piccadilly, London.

May 20 to 23.—Incorporated Sales Managers' Association of the United Kingdom. Annual Conference. "Creating Business Prosperity through Salesmanship." Hotel Victoria, London.

May 20.—Royal Institution. "Faraday at the Sign of the Hexagon: Coal Colour and Constitution." Henry E. Armstrong. 9 p.m. 21 Albemarle Street, London.